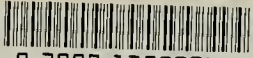


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Huntington's Ore-Feeder.

Frank A. Huntington of this city manufactures an ore-feeder patented by himself, which is illustrated on this page. It is simple in construction, and while in motion, may be adjusted to feed fast or slow. The ore falls from the hopper on to an inclined table, where there is an adjustable gate to control the discharge. The table has its front end supported on a rocking bar and its rear end upon a similar rocking bar or link, these two being fulcrumed at the bottom so, as they are oscillated back and forth the table slides beneath the hopper and in line with the bottom. The back of the hopper has a groove into which fits the upper edge of a plate, or it is otherwise hinged thereto, and the lower edge rests in a similar groove on the surface of the table, so that as the table moves slowly back and forth, the edge of this plate is moved with it, the upper edge turning in the groove or channel which forms the hinge or fulcrum.

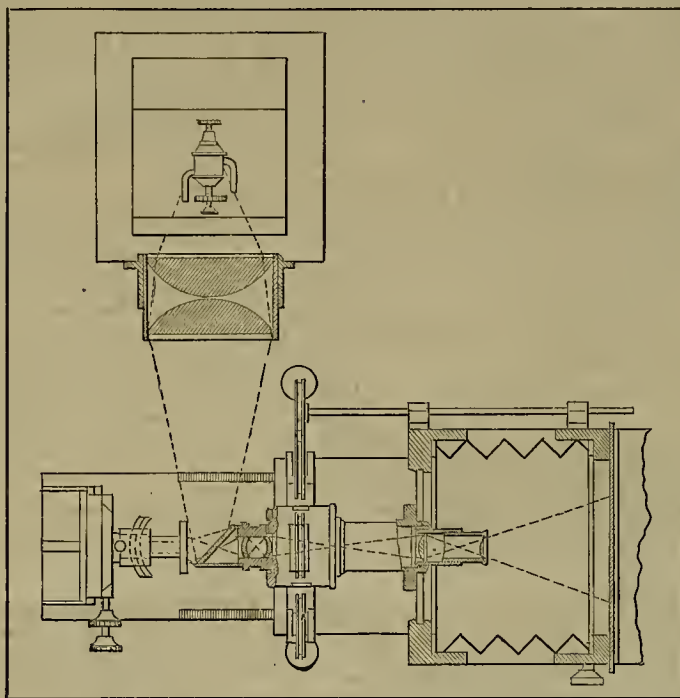
The ore passing out of the hopper, falls on the front end of the table. As the table moves forward, it carries this ore along, allowing none of the ore to come out from the hopper; and as it is drawn backward, the ore is prevented from moving back with it, and this causes the ore which is already on the front of the table to drop off as the table moves back. The next motion forward carries the ore toward the front and more falls in behind it from the hopper, and the discharge becomes steady and continuous with each oscillation of the table.

In order to oscillate and regulate the oscillations of the table the rear link has an oval slot made in its center and through this a shaft passes, having a cylinder fixed to it. This is made to act as an eccentric by boring or cutting from the center of one end to a point near one side on the opposite end, so that as the shaft is rotated by suitable power if the cylinder is moved so that the point where the shaft is in the center of the cylinder is within the slot, there will be no motion conveyed to the link or rocker-arm, but by moving the cylinder along the cam until that portion which is eccentric

to the shaft is within the oval slot, the greatest throw will be given to the oscillatory link and the table will be given the greatest motion. By sliding the cylinder along the shaft any degree of throw may be given to the table between this point and that of no throw, the adjustment of the cylinder being accomplished at any time without stopping the machine. By this mechanism the feed may be regulated to any degree of nicety by altering the throw of the eccen-

tric and varying the movement of the table. This feeder is especially designed to feed the Huntington roller quartz mills so well known in mining regions all over the coast.

ELECTRIC PUMPS.—The accompanying engraving shows one of the possibilities of an



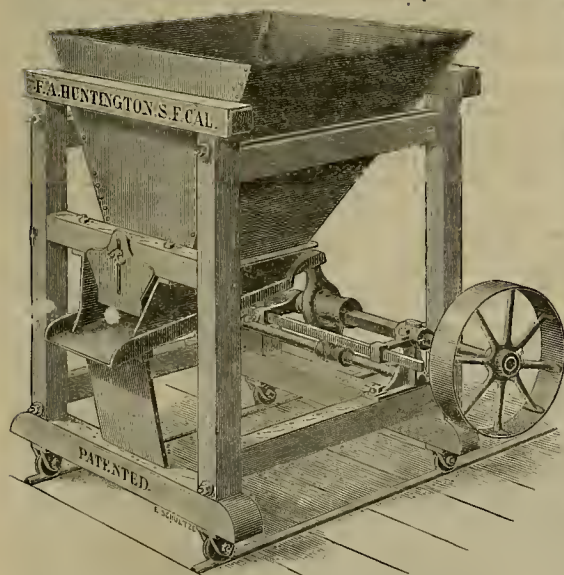
APPARATUS FOR PERPENDICULAR ILLUMINATION IN MICROPHOTOGRAPHY.

electric pump. It may be placed at any convenient point on the river-bank a long distance from the power-house, and the water raised to the desired elevation. The dynamo is in the engine-house and the electric motor is arranged on the Gould pump at the pump station. This is only one of the many methods where electric pumps may be employed.

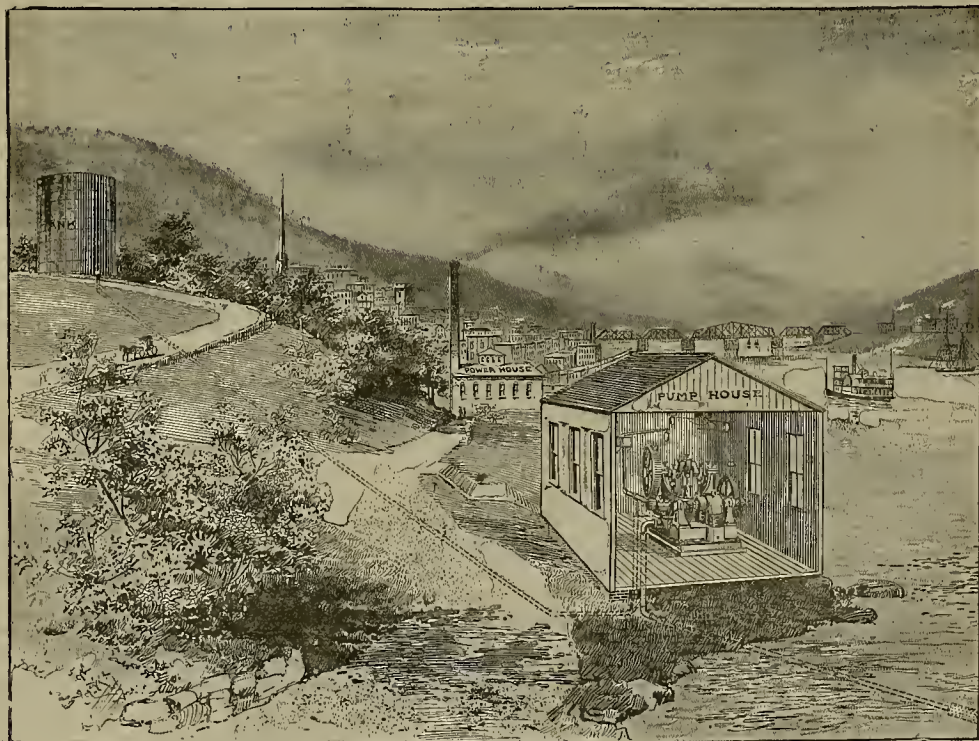
Microscopy of Iron.

The microscopy of iron is constantly widening its field. The method discovered by Sorby nearly 30 years ago, namely, the examination of carefully ground sections instead of the surfaces of fracture, has been increasingly employed. Samples of metal are ground upon metallic disks, carefully polished, cleaned and etched lightly with very dilute hydrochloric acid in order to bring out the variations of texture, which are always present, even in the finest crucible cast steel, and which are made distinguishable by the varying depth to which they are attacked.

The aid of photography has been invoked to make the results obtained by single observers the property of all. In photographing sections of this kind, only ortho-chromatic plates can be used. A further difficulty, namely, that to get a true photograph, the illumination of the section should be perpendicular to its surface, while at the same time the section must be placed perpendicular to the axis of the microscope, through which it is photographed, has been overcome by the use of a parallel-plane glass plate, which serves also as a mirror. The accompanying illustration is a convenient apparatus now used for this purpose, described in Dr. Wedding's paper on Progress of German Practice in Metallurgy, from which we have recently made several quotations.



THE HUNTINGTON ORE-FEEDER.



ELECTRIC PUMP AT A DISTANCE FROM POWER STATION.

The Miners' Association of Nevada Co.

At the recent Mining Convention in Nevada City, J. S. McBride of North San Juan was elected chairman. In accepting the position, Mr. McBride made a comprehensive, eloquent address of 10 or 15 minutes duration, first reviewing the situation. Continuing, the speaker showed that the area for the production of crops is illimitable, while the area for profitable mining is very limited the world over. This and other facts the people are awakening to the realization of. California's gold gave the nation credit when the monarchies of the Old World were eagerly awaiting the dissolution of the Republic, and this credit enabled the carrying on of the war to a successful close. If for no other reason than this, the Government should protect and foster the mining industry. It is not desired to injure the people of the valley, but to so conduct operations that all shall be benefited and none injured.

Mr. McBride refuted the argument that the hydraulic mines were of no benefit to the general public—that they are owned by foreigners and employed only Chinese, powder and water in their operations. He declared that of the hundreds of hydraulic mines of the State, but three or four are owned by foreigners, and that none of the large mines and but few of the smaller mines employed Chinese.

The speaker's peroration was a glowing picture of the prosperity to ensue from the opening of the mines—prosperity that would quickly place the mining counties on their former important level in every respect, and San Francisco again among the leading commercial cities of the world.

The report of the Committee on Resolutions, which was adopted, was as follows:

WHEREAS, The experience of the world has demonstrated that gold and silver constitute the only safe, convenient and reliable basis of credit; and

WHEREAS, The output of gold is largely below the needs of mankind; and

WHEREAS, A commission of Government engineers has reported that at the expenditure of \$1,500,000 for restraining works, \$335,000,000 may be extracted by the hydraulic process without injury to the valley rivers; and

WHEREAS, Hydraulic mining as heretofore prosecuted has contributed to the injury of the navigable streams of the central portion of California and to a small portion of agricultural lands of the valleys, and has in consequence been interdicted by the State and Federal courts; and

WHEREAS, A commission of eminent engineers appointed by the general Government of the United States has, after an exhaustive examination, reported that by the erection of proper dams, barriers and catchment basins, hydraulic mining may be resumed the debris therefrom restrained and no injury done to the navigable streams or to the agricultural lands of the State; and

WHEREAS, Under the comprehensive terms of restraining orders heretofore issued by the courts, hydraulic miners are inhibited from discharging the tailings from their mining claims into the ravines, canyons and streams tributary to the main rivers, even though so impounded as to render injury impossible; and

WHEREAS, It will be observed that the decree is not against hydraulic mining in name, but against the dumping of debris into the streams, ravines, etc., and it would therefore include all classes of mines should any action be considered necessary to prevent the debris from said mines entering the streams. All gold mining in California is hydraulic, being the same in principle, running water separating gold from the matter in which it is imbedded. It is therefore

1. *Resolved*, That to assume that hydraulic mining cannot, by due precaution, be resumed without injury to others is to impeach the genius of the age.

2. *Resolved*, That the State convention of miners, soon to assemble in San Francisco, be respectfully requested to memorialize Congress on the subject, and to use its influence for the passage of such laws as shall rehabilitate the industry of hydraulic mining upon the erection of such permanent restraining works as may be certified as safe and sufficient by competent engineers appointed for that purpose, the cost thereof to be borne as by law provided.

3. *Resolved*, That in view of the fact that the Government of the United States sold to the miner his claim and received the cash therefor for the express purpose and with the full knowledge that it was to be mined by the hydraulic process, and in view of the fact that the credit and very existence of our Government has been heretofore saved by the output of the gold mines of California, and in view of the further fact that in every financial crisis which may hereafter arise, relief must be looked for from the same source, we deem it but just that the expenses of restraining dams should be met by the general Government.

4. *Resolved*, That said State convention be requested to memorialize our Senators and Representatives in Congress to make sufficient appropriations for the construction of restraining dams for the impounding of mining debris, as recommended by the Board of Government Engineers.

5. *Resolved*, That said State Convention be also requested to memorialize our Senators and Representatives in Congress to secure such modifications of the mining laws as will prevent the Interior Department from practically nullifying the intent of the Congress enacting them.

6. *Resolved*, That we, the miners of the county of Nevada, in convention assembled, at once proceed to permanently organize for the purpose of protecting the mining industry in all its forms, to the end and intent that we may secure from the State and National Governments full protection in our just rights in pursuit of a legitimate industry, whereby and through which our county will again prosper as in the past, and that we proceed to the selection and appointment of such permanent officers and committees as may be needed, and we recommend that the officers consist of a president, ten vice-presidents, a secretary and assistant secretary, an executive committee of five, and a treasurer, and that such county organization be authorized to act in cojunction with other and like county organiza-

tions and with any State organization for like purposes hereafter formed.

7. *Resolved*, That thirty delegates be selected to attend the Miners' State Convention to meet in San Francisco, January 20, 1892, and that no person be so selected who does not pledge himself to attend.

In conclusion, we appeal to all miners of the county, and to all persons friendly to mining interests, to unite with us forwarding our just cause and in aid of the several steps necessary to disenthrall the industry by which alone prosperity can again be wooed to our homes.

NILES SEARLES,
J. G. MATHER,
A. TREGIDGO,
J. M. WALLING,
GEORGE FLETCHER,
J. B. HOBSON.

How the Funds Were Raised.

A committee was appointed to enroll the names of those present who were willing to join a permanent organization. The sum of \$1 was collected from each one signing the roll, the money thus raised to be used to meet the expenses of the organization.

The convention permanently organized by the election of Alf. Tregidgo as president and the following vice-presidents: J. S. McBride, R. McMurray, Niles Searles, H. O. Callaghan, Jerry Goodwin, Edward Coleman, N. C. Miller, P. Campbell, D. K. McKillican, Geo. Fletcher; secretary, W. F. Englebright; assistant secretary, Capt. Nibell; treasurer, Frank Snell; executive committee, Judge Walling, Geo. G. Allan, M. L. Marsh, Geo. Fletcher, Alf. Tregidgo; finance committee, Joseph Weisslein, John Rector, John T. Morgan, Cal. R. Clarke.

Delegates.

Delegates to the State Convention were elected as follows: McBride, A. B. Dibble, D. T. Hughes, J. M. Walling, A. Tregidgo, L. S. Calkins, P. Campbell, G. D. McLean, N. C. Miller, McKillican, Dobbie, Callahan, Turner, J. S. Mather, T. C. Hocking, E. Coleman, Nibell, Geo. Fletcher, Tilley, J. Goodwin, Joseph Weisslein, Elliott, C. J. Brand, H. Place, Wiltse, A. Burrows, Geo. Hare, Englebright, McMurray, C. D. Easton, Pat. Foley. The last two are alternates.

Patents at the Fair.

A new departure will be made by the Patent Office at the World's Fair in Chicago. Hitherto, it has never attempted to go beyond an exhibition of photographs and drawings. In this instance, it will offer an elaborate and comprehensive display of models. The show will be designed to illustrate as completely and as vividly as possible the age of mechanical civilization. It will give in concrete form a picture of the progress of invention.

The Commissioner of Patents says that the great exhibit of the Patent Office will be displayed. All that will be attempted in the show proper of his bureau will be to illustrate the processes through which those achievements have been perfected. For this purpose, groups of models will be prepared. For example, one group will represent the progress of the steam engine, beginning with the first one, which was built 150 B. C. by a Greek named Hero. It had a boiler and was able to do work by means of a shaft and belt attachment. From this primitive contrivance to the modern Corliss engine, in miniature, an interesting series will extend.

Other groups will be similarly arranged. One will represent the printing press, all the way from Gutenberg's original invention to the rotary Hoe machine, which turns out newspapers at the rate of many thousands per hour and folds them ready for delivery. In electricity, wonders of all sorts will be illustrated by progressive series. There will be telephones running all the way from the primitive conception to the perfected instrument now in use. The telegraph will be introduced with the actual instrument made by Morse, by which the first experimental messages were sent over the wire from Washington to Baltimore, this line of discovery culminating with the latest devices for printing messages at any distance with type and transmitting one's own handwriting across thousands of miles of space in a fraction of a second. The growth of the locomotive will be shown in like manner; also, that of the sewing machine, of the marvelous modern agricultural implements from primitive types; of clocks, from the water clock of ancient Babylon and the later hour glass, etc.

Many of the models required for these groups are already in the possession of the Patent Office, but a large number will have to be constructed especially for the purpose. Manufacturers all over the country will be asked to supply specimens of their products for representing the latest developments of inventive art. The locomotive works will be requested to lend miniature models of their newest engines. Makers of agricultural tools and sewing machines will contribute the most improved specimens of their handiwork. Likewise with printing presses and everything else. Few, if any, of the mechanical models will be set working, however.—*Washington Star*.

ALIEN LAND ACT.—Judge Collins of Chicago has rendered a decision declaring unconstitutional the alien land law passed by the Illinois Legislature of 1887. Under the Act nonresident aliens cannot acquire property, by descent or otherwise. Judge Collins said he thought the Act foolish and the Legislature mad when it passed it.

Non- Liability of Employers.

A Decision of Great Importance to Mining Men.

The Supreme Court's decision in the case of Samuel Trewatha vs. the Buchanan Gold Mining and Milling Company (appellant) filed in Sacramento, is important to mining men. The case was appealed from Tolueme county, and the question involved was as to whether or not a corporation is liable for damages for injuries to an employee through the carelessness of a fellow-employee.

Trewatha brought this action to recover damages for injuries received by him while he was employed in the mine of the Buchanan Company. The company alleged that in June, 1889, he was working in the mine, and James Donahue was the engineer who operated the engine which lowered and hoisted the tackle in the main shaft. Trewatha also claimed that Donahue was incompetent and did not have ordinary skill as an engineer, and that the company was aware of this fact, and, moreover, did not furnish the engineer the necessary appliances and means with which to safely operate the engine and hoisting works.

In June, 1880, while Donahue was engineer, Trewatha was working in the mine at the 200-foot level, and had occasion to go up to the surface in obedience to the company's directions. He got into the bucket and the engineer proceeded to hoist. The bucket was carried up with such speed and irregularity that Trewatha was thrown with great violence against and over the sheave and was injured.

The answer of the company denied all of the material averments, and alleged that any injuries sustained by Trewatha were caused by his own negligence.

The case was tried before a jury and a verdict returned in favor of the plaintiff for \$4000 damages. The company moved for a new trial, on the ground that the verdict was not justified by the evidence, and that errors in law were committed by the court. The motion was denied, and an appeal was taken from the judgment and order.

The Supreme Court quotes Section 1970 of the Civil Code and adds: "We do not think that the verdict and judgment can be sustained, even if it be admitted that the appliances complained of were as defective as it is claimed they were. The immediate and proximate cause of the injuries sustained by the plaintiff were very clearly shown to have been the negligence of his coemployee; and this, as we understand it, is in substance the averment of the complaint; nothing but carelessness can account for the fact that the engineer allowed the bucket to be hurled against the sheave—23 feet above the upper platform—whether he supposed he was hoisting a man or something else; but the rule is that where the promoting cause of the injury is the negligence of a fellow-servant, no recovery can be had, even though the machinery or appliances be defective." * * * We advise that the judgment and order be reversed and the cause remanded.

Four Hundred Millions.

What This Means When Applied to Silver.

The Treasury of the United States had in store on the 1st of October, 1891, 348,341,193 silver dollars; \$15,848,620 in the form of subsidiary silver; silver hore to the value of \$41,579,253; trade dollars (bars), \$2,394,260; total, \$409,161,326, or, in round numbers, \$400,000,000. The Government, furthermore, is increasing this immense store by buying seven additional tons of silver every working day in the year.

Now what does \$400,000,000 worth of silver mean? Stated in figures or expressed in words it conveys to minds as ordinarily constituted no definite idea other than that of an incomprehensible something endowed with certain potentialities—possibly for good, possibly for evil; yet silver is a physical entity, possessing the properties of length, breadth, thickness, capacity to occupy or fill space, and weight. Let us apply these properties to the \$400,000,000, and note some of the results of such application.

Coined into dollars, the product will weigh over 22,000,000 pounds avoirdupois, or 11,000 net tons, and if its movement is desirable will necessitate for so doing the use of 1000 railroad freight cars carrying 11 tons each, or 2200 cars carrying five tons each, or 5500 two-horse wagons carrying each two tons.

A cubic inch of pure silver weighs about 0.38 pound, and a cubic foot about 657 pounds; hence the \$400,000,000, if melted into a solid mass, would occupy some 33,500 cubic feet, which in turn would make a solid column of pure silver a foot square and about 6½ miles high, the Washington monument being 550 feet. Assuming a load of 100 pounds per man, an army of 220,000 men would be required to carry the mass, and would make a file, in close order, 80 miles long, occupying 30 hours in "passing a given point," allowing nothing for halts or rests.

The Treasury counts its silver by weighing it, which is the part of wisdom, in view of the fact that a man, counting at the rate of 200 dollar pieces per minute steadily, for eight hours a day, Sundays included, would be kept busy for considerably over 11 years.

Filed one upon the other, the \$400,000,000 would attain a height of 675 miles; and placed side by side, they would carpet a room 50 feet wide and nearly 24 miles long.

Great, however, as is the mass of silver at

present in the "treasure-houses" of the Government, it is being steadily increased by the purchase of 54,000,000 additional ounces every year, or at the rate, as before stated, of seven tons for every working-day of the year.—*David A. Wells, in Harper's Weekly*.

'Tis All Mineral Land.

An Important Decision Made by the General Land Office.

One of the most important, if not the most important, decision in the history of the Helena Land Office is the decision made by Commissioner Carter, the text of which has been received at the Helena Land Office. It bears upon the all-important question of what are mineral lands as contemplated to be exempt from the grant of the Northern Pacific. The case is already celebrated under the title of "Richard P. Barden and others, mineral claimants, against the Northern Pacific Railroad Company." Barden and associates took up five mineral claims, the Vanderbilt, Ponr Jacks, Channoe Depew, New York Central and Hudson River lodes, comprising 96 acres of very valuable land two miles from Helena. The Register and Receiver of the Helena office decided that the Vanderbilt lode was mineral, but that the others were not. The Commissioner of the General Land Office decides that all the lands are mineral in character. This same land, it will be remembered, has been in litigation for a long time. The late Judge Sawyer, during a visit to Helena shortly before his death, delivered an opinion on the case in the United States Circuit Court, in which he held that as the land was not known to be mineral at the time the railroad filed its map of definite location, it was not exempted from the grant. At the same time, he did not pass on the mineral or nonmineral character of the land. This the Commissioner of the General Land Office does. The case will have to go before the United States Supreme Court before the final settlement of the question in dispute is reached, and not until then will it be definitely known what was the full meaning of the word "mineral" in the railroad land-grant Acts.

Commissioner Carter, in his opinion, says the land in controversy was surveyed in 1868, and returned as agricultural land by the Surveyor-General. The Northern Pacific's map of definite location of the road opposite these claims was filed in the General Land Office July 6, 1882, and the tracts were selected Nov. 8, 1886, by the company; but no patent has been issued. In 1889 the mineral claimants applied for a patent, which the Helena office did not allow. On Dec. 21st of that year, Richard P. Barden made affidavit, alleging that the land was mineral in character, and therefore excepted from the operation of the company's grant.

A hearing was ordered, and the evidence given induced the register and receiver of the Helena Land Office to find that the Vanderbilt lode came within the meaning of the term "mineral lands," and that a patent should be issued, and that the other claims were not mineral. The testimony was that all the claims contained gold-bearing quartz. The commissioner says: "Upon carefully considering all of the evidence before me, I am of the opinion that it shows that mineral exists in each of these mining claims in sufficient quantity to add to its richness and justify expenditure for the extraction of ore and its exportation. In my judgment, the evidence is sufficient to warrant the finding that all the land involved in this controversy is mineral land within the meaning of that term as used in the Act granting land to the Northern Pacific Railroad." The selection by the railroad is ordered cancelled.

In conclusion, the commissioner says: "My attention has been called by the company's counsel to a case between these parties involving this same land, which was recently heard in the United States Court for Montana. The case appears to have been a suit at law brought by the company to recover possession of the premises and \$100, the value of the ore extracted by the defendants. In the complaint, the company alleged ownership of the property under its grant, and as it was not known to be mineral land at the time of the filing of the map of definite location of the road, the defendants demurred to the complaint. The presiding judge held that the demurrer should be overruled, and the district judge sitting in the case rendered a dissenting opinion, holding that the demurrer should be sustained. I am further advised that said case is now pending in the United States Supreme Court. The principal question considered by the court in the case cited was fully considered by the honorable secretary in Central Pacific vs. Vallentine, and the rule adopted in that case is herein held to control the case now being considered, in so far as it is applicable thereto."

THE BLUE LEAD.—This morning Messrs. Gardner Osgood and R. F. Floyd paid the *Mercury* a visit, and the Blue Lead was naturally discussed. Mr. Osgood has lived at Bangor for many years, and Mr. Floyd moved from there to Sonoma about six years ago, but retains an interest with Mr. Osgood in 50 acres of the lead. These gentlemen stated that in 1857 the Boyle brothers discovered the lead and in a few months took about \$40,000 from their small claim. The spring following, Mr. Floyd located a claim 180 feet in length and 80 feet wide. He took from that claim \$45,000 at

a cost of \$13,000 and it required but a few months to work out his claim.

In the meantime about forty locations were made and shafts started. Just at that time the Fraser river excitement swept the country, and the miners on the Blue Lead, as well as everywhere else, caught the fever and abandoned their claims, leaving their tools and machinery to ruin.

The old channel is easily followed, and runs toward the northwest. The pay gravel is found at depths ranging from 60 to 180 feet, according to topography. In some of the tunnels petrified wood and leaves have been found more than 100 feet below the surface. Four or five companies are at work there at present, and the prospects are growing better daily.—*Oroville Mercury.*

Yuba County Miners' Meeting.

A miners' convention was held at Smartsville, Yuba county, on Dec. 18th. The meeting was called to order by C. F. Ayer, who spoke at length upon the objects of the meeting and urged unity of action in the matter of organization, looking to the resumption of mining, and hydraulicking in particular.

A permanent organization was effected with James Nelson, President; James O'Brien Sr., O. G. Mayo, P. Campbell and C. F. Ayer, Vice-Presidents; W. J. Stewart, Secretary; S. A. Davis, Assistant Secretary; and Louis Conrath, Treasurer.

James O'Brien Sr., C. F. Ayer, L. Conrath, W. W. Chamberlain, John McQuaid, R. W. Traft, A. P. Brown, Thomas Finmore, Daniel Gettins, James Nelson, Owen Owens, Larkin Choate, Joseph Merriam, R. M. Johnson, J. C. Campbell, Chas. F. Foss, A. F. Roberts, Henry Conwell, Jas. Malaiev, Thos. Birmingham, J. H. Drake, John H. Robertson, O. P. Merrill, J. C. West, T. Cochrane, O. G. Mayo, R. Brown, John R. Kennedy, Fred Joubert and Thomas Freeman were chosen delegates to the State Convention.

An Executive and Finance Committee was elected with the following members: James Foster, O. G. Mayo, P. Campbell, A. F. Roberts, T. F. Finmore, J. C. West, L. Conrath. The roll was opened for membership of the association, and every miner present was enrolled.

The following account of the meeting we take from the Marysville *Appeal* of Dec. 20th:

A series of preambles and resolutions was adopted by acclamation, amid great enthusiasm. The resolutions bear no mark of ill-will or malice toward those associations handed together for the suppression of all mining by the hydraulic process, but appeal with candor for an adjustment of the present injunctions, and invoke the aid and protection of the National Government for this industry, which has turned so many millions into the Nation's purse in its hours of greatest need. They further speak:

We know that it needs but a fair showing of our side to convince the most skeptical that mining, to its fullest extent, can be carried on without injury to any one, and can be made a great benefit to all by an outlay of money which will be but a trifling portion of the millions which will be derived from the resumption of that industry. The injury occasioned by the closing of the mines to the owners, the losses they sustained, and the necessity for national aid to permit of the construction of restraining dams, such as reported by the engineers of the Biggs Commission.

The protection given by our Government to other industries, and asking why this great industry cannot receive Government aid, calls for one resolution. Another bears upon the relation mineral land has to others in the Interior Department, and sums up all in these resolutions:

Resolved, That the representation of this, our county of Yuba, at the Convention of Miners to be held in San Francisco on the 20th day of January next, are hereby requested to use all honorable means of having our needs placed properly and fairly before the people of our State, and before the people of the United States, through their representatives in Congress and in the Senate; that sufficient assistance may be given to an industry, the benefits of which are so general.

Resolved, That our representatives be authorized and required to assure the people of the valleys and of the State that we believe that in helping the miners, they will as certainly help themselves, and that it is the wish and intention of the miners only to resume mining in such a way as to injure no one. That the construction of the restraining works asked for will not only prevent injury for past mining done, but will prevent all injury in the future, and that the people of the valleys and of the State be asked to act in harmony with us in this matter, and to join with us in asking for the necessary relief.

Resolved, That the best endeavors of our representatives be used to secure such changes in our laws relating to mineral lands that there can be no misconception of their meaning and intent; so that our rights need not be jeopardized by the ever-varying rulings of the Interior Department at Washington.

The Secretary was instructed to request the county papers to publish the resolutions and to have copies sent to the other papers in the State.

The meeting hall was draped with flags and every seat was taken, even though the day was stormy.

After the appointment of various committees, the meeting adjourned to the call of the President.

BRAZIL has 200,000 square miles more of territory than the United States.

Quicksilver in Napa Co.

Quicksilver interests of Northern Napa county are represented largely by the Napa Consolidated and Aetna Quicksilver, both old and well-known mines, their production being approximately the same. The St. Helena *Star* gives the following bit of history of quicksilver in the county:

The discovery of the Napa was made by a man named Rogers, whose sobriquet was "Squalt Eye." He it was who sunk the first shaft, 30 feet in depth, on what is now known as Oat Hill, and following him, many others made locations, the principal ones being Cook, Porter, Vivian and Welsh, all well-known men in this section. They owned the mines which were afterward sold, and known as the Napa Consolidated Quicksilver Mining Company, the mine from which this company later on took the largest amount of quicksilver, being "thrown in" for the consideration of \$1.

At this time, the country now so well settled up was comparatively unknown, and in its native state of wild luxuriance of forests, overgrown with verdure. The mine, and the company's property in general, are situated in the northern part of Napa county, close to the line between Napa and Lake counties, in a section of the country admirably adapted to mining; the abundance of timber, the plentiful flow of clear, cold water, and the hillsides, so well situated for dumping purposes at mines and furnace, make it a favored spot. Taken into conjunction with these natural advantages, is the fact that quicksilver abounds there, and that for years the Napa Consolidated has paid dividends regularly to its owners.

In its infancy, the mine was purchased by a syndicate of San Francisco gentlemen. The management was at different times placed in the hands of Superintendents Sen, Coe and J. B. McGee, but was finally turned over to M. G. Rhodes, well known in Napa county, who for seven years operated it successfully.

During this time, the property was purchased by an Eastern syndicate, and the stock placed on the Eastern market. Part of the same companies, together with other new investors, soon after purchased the group of mines in Upper Pope valley, known as the Pope Valley Quicksilver Mining Co., and the two properties were operated under one management for about two years.

At the close of this time, Mr. Rhodes being an owner in the Aetna Quicksilver mines, gave up his position at Oat Hill, and removed to that property, which he has since managed, and was succeeded as superintendent of the Napa Consolidated mines by W. P. Lawlor, who remained in charge for a short period. Following him were several superintendents, among them being M. T. Brown of San Jose, and finally the company secured B. M. Newcomb of Colorado, an efficient mining man, who has for the past five years managed the mine in a manner satisfactory to all concerned, and is now putting out quicksilver regularly, and also paying dividends.

The Aetna Quicksilver Mining Co.'s property consists of a group of mines, mentioned above as having formerly been known as the Pope Valley Mining Co., among them being the Star, Washington, Phoenix, and Silver Bow, and was purchased by and incorporated as the Aetna Quicksilver Mining Co., from D. Patten, John Lawley, et al.

The Star was originally located by Mrs. Patten as agricultural land, but happy chance sent a wandering cow that way one day, so it is said, and she has the honor of discovering the Star, for in her nibbling among the grass roots she uncovered the ledge which afterward became the mine.

The discovery of the Phoenix belongs to John Newman. Like all old mines, it has passed through many hands, seeing its best days between 1870 and 1875 under the management of Mr. Fellows, who paid off its debts and put it on a paying basis. At this time the mine consisted of two reading rooms, where books and papers abounded, and employees enjoyed them as they only can, who are shut "from the rude world apart."

Originally the mines were worked separately, each being owned by different parties. Two furnaces were in operation, one known as the Valley Furnace, and the other as the Washington, and the ores from the several mines were sent to the furnaces to be burned, being carried in bags on the pack mules used for that purpose, and driven by Mexicans. Afterward a furnace was built on the Phoenix, and when the Aetna Quicksilver Mining Company took hold, it was torn down and removed, and is now known as the Star Furnace, being placed so as to be convenient to the Star mine, which formerly worked in conjunction with the Washington mine and furnace.

A period of time passed, the property meantime paying dividends, and then work was begun on the Phoenix, a shaft 300 feet deep being sunk, and levels and crosscuts being run. This work not proving satisfactory, the Silver Bow was then opened, which showed an encouraging prospect. Two tunnels were run on the ground, one 300 feet, the other 400 feet from the surface, and finally the old original Phoenix tunnel was extended under the Silver Bow tunnels, and a shaft is now being sunk in the latter mine to connect with the Phoenix tunnel, through which, when the work is complete, the ore will be hauled in the future, instead of being hauled in wagons as formerly.

The middle, or No. 2, tunnel machinery is operated entirely by compressed air; that is,

engines, pumps, drills, etc., while the No. 3, or Phoenix tunnel, also uses a compressor, to force air to men nearly three-quarters of a mile under ground, and will, later on, operate a drill also, by the same means.

The work is being pushed as rapidly as possible, and by spring, the company hopes to have the mine in full operation, which will be soon followed by dividends if success only greets the hardy miner at the close of that time.

Prospectors' Pointers.

Old-Timer Instructs the Tenderfoot Prospector on Locating.

"Here, young man! Bring me the end of that tomato box there and I will show you how to write a location notice," said the Old-Timer to the Tenderfoot Prospector as the former stood on the dump of the Catharine looking at the printed blank notice filled out with red ink, tacked up against a tree: "Take that one down and roll it away as a souvenir, and if you have others like it stuck up on any locations you have regard for, go and tear them down and put up new ones or they will fall down by themselves. This notice business is among the first things that you want to learn, for it sometimes is of very vital importance to your claim. When you use a paper notice filled out or written wholly with ink, it will blur out with the first rain-storm and the first wind will tear it down. Take a soft pine board and a hard lead pencil and the writing will sometimes outlast your claim. I have seen such notices that have withstood the storms of seven or eight years and still remain legible. There is a great variety of ways to write a notice, and nearly every prospector has his own way. But the briefest and most concise way is as good as any and the easiest. Now, I'll write you one for the Catharine this way:

CATHARINE LODGE.

NOTICE IS HEREBY GIVEN THAT I, the undersigned citizen of the United States, having complied with Chapter 36 Title 32 Revised Statutes of the United States and the local regulations of Barker district, claim, by right of discovery, 1500 feet in length and 600 feet in width along the mineral-bearing vein to be known as the Catharine (or any other name).

Beginning at center of discovery shaft and running: "How far do you run northerly?" "Seven hundred feet northeast."

"Seven hundred feet in a northerly direction and 800 feet in a southerly direction."

"Always say northerly, southerly, easterly and westerly in writing notices. Don't give it any specific direction. When you say 'northerly,' it gives you a chance to swing your stakes all around the North Pole, if necessary. You can swing your stakes after your location is made any way you want to, provided there are no conflicting claims unless you change from northerly and southerly to easterly and westerly, or vice versa. In that case, you have to make an amended location and record it. Let's see. Where were we? Oh yes; together with 300 feet on either side of the vein."

"Located this 18th day of June, 1791."

Locust—TENDERFOOT PROSPECTOR.

"Now that is all necessary to hold any claim, as far as the notice goes. Some prospectors put in a claim for all dips, spurs, angles and variations throughout the width, breadth and depth of the claim, but that's all foolishness. The law grants you all the spurs, and angles and dips you want. You just go ahead and do as the law requires you to do to hold any mining claim. There is no danger but that you will hold all the mineral-bearing rock inside your stakes whether you ever found them or not. As long as they are inside your stakes they are yours, and you don't need to say in your notice that you want them. When you stake your claim off, remember that only about two claims in one hundred are full size. Prospectors nearly always step them off and count three feet to a step, when 2½ is nearly the correct length. The soldier's step, which is a good stride, is 28 inches. The best, but not the most convenient way, is to take a tape line. Figure your steps at two and a half feet, and don't be afraid of getting too much ground, for when you have your claim surveyed for patent, the surveyor will draw your stakes in if they are too wide, but he will not push them out if they are too narrow. The survey must be made inside your stakes. A compass is a very good instrument to have also, so as to get your claim as nearly square as possible.

Every prospector thinks that his claims are laid out square, but I dare say that there is not a claim in Montana where the lines all turn at right angles. When you are locating several claims together, it is proper to use one post for the corner of two or more claims, instead of cutting a post for each claim corner. Or if you want to join claims with some one else's claim, you have a right to use his post for a corner also. I have seen old prospectors locate two claims together, and cut a post for each and stand them side by side, when one post, with the name of the corner of each claim written on it, would serve as well. Besides, where your claims join—it don't make any difference if they join by only a foot of ground, but they must join—it makes them continuous claims, and you can do all your work on one claim to represent them all. If you wish to patent them, \$500 worth of work is sufficient to patent them all as though they were one claim. How much does it cost to patent a claim, did you say? Oh, about \$250, besides the \$500 worth of work to

be done, and that must be done before you can make application for a patent. You make application to the Surveyor-General, and if sufficient work has been done, you pay him \$30 and he grants it. If you have several claims in a group, you apply for each separately as a continuous claim, and pay \$30 for each. Then the surveyor charges you about \$75 to do the work. He must be a deputy U. S. mineral surveyor. You pay about \$20 for advertising, and the land office fee will be about \$125. That's about all I know of.

"Well, we will look over the claim."—*Butte Bystander.*

THE BLUE JACKET MINE.—Judge Hunt, last week, refused to grant a new trial in the suit of S. Mattingly against the estate of Thomas Blythe. In October, 1882, Mattingly made an agreement with the late Mr. Blythe to find a purchaser for the stock of the Blue Jacket Mining Co. Blythe's price was \$300,000, and he told Mattingly he could have all he got over that amount. Mattingly succeeded in getting an offer for the mine of \$425,000, which he communicated to Blythe, who repudiated the contract he had made. Thereupon Mattingly commenced suit for \$125,000. The jury in Judge Flinn's court, where the case was tried, gave judgment for the plaintiff for \$75,000, but the Supreme Court reversed it on an error. The case was tried over again in Judge Hunt's court, before a jury, and resulted in the plaintiff being awarded the full amount he claimed, \$125,000. The defense asked for a new trial, but having been refused, they will take another appeal to the Supreme Court.

OIL IN NEW MEXICO.—A dispatch from Albuquerque, N. M., dated Dec. 23rd, says: It has been known for many years that a coal oil belt, crossing New Mexico from east to west, extended under nearly the whole of the county, but no company with capital enough to push the business has ever made an attempt to develop the field. Major J. W. Donnelly of the Atlantic and Pacific Land Department has just closed a deal with the representatives of a strong Eastern syndicate for a tract of railroad land in the oil region, the price being \$50,000. The purchasers intend to commence development at once with all possible vigor. This has created an active interest in oil matters here, and parties of prospectors are fitting out to search for oil on Government land. Competent geologists have declared that the indications of oil in many portions of this county are unmistakable, and that it only requires work and capital to make this a strong producing district.

PROSPECTING IN THE MOJAVE DESERT.—Col. T. W. Brooks of Pomona recently returned from a prospecting trip on the Mojave Desert and up in the region around Death Valley. He traveled over 800 miles alone. He says the mineral resources of the country are alone enough to warrant the building of the proposed railroad from Salt Lake to Los Angeles. He gives details of veins and deposits of silver opened up by Salt Lake and other miners which alone would almost furnish enough traffic for a road, but at present the ores can not be profitably handled. Being alone, with the care of a team in a country inhabited only by a few wild beasts, lizards and stray birds, he did not do much practical prospecting, but he saw enough to convince him that that apparently worthless and very forbidding country is of immense value, and that the wild beasts, birds and reptiles will not have exclusive possession much longer.

THE TYPEWRITER has hitherto been supposed to be an English invention, subsequently developed by the Americans; but a patent has been discovered in the French archives which gives the credit of originating the idea to a Frenchman, M. Pognin, of Marseilles, who devised and illustrated his apparatus as far back as 1833. "With a little practice," says the author, "one can write as rapidly with the typographic pen as with the ordinary pen. I have called it the typographic machine or pen, because it prints by striking. It will give birth to a new art." Latest developments of the invention are a typewriter for the blind.—*Machine.*

STILL THE KING-PIN.—Excitements may come and go, but one fact remains indisputable; that is that the Silver King on Toad mountain is the king-pin mine of the Kootenay Lake country. Three shifts are again at work in the main tunnel, which is in about 700 feet. Every crosscut run encounters ore, the one known as No. 6 cutting a body 47 feet wide.—*British Columbia Miner.*

CALIFORNIA TIN.—A dispatch from San Diego, dated December 21st, says: The first full carload of American tin ever produced from an American tin mine was received by W. W. Stewart from the Temescal mines. The shipment consisted of 420 pigs, or 36,800 pounds. The output of the Temescal mines is being increased, and American tin will be regularly put on the market in carload lots.

THE Lemhi Gold Placer Company of Idaho has begun the construction of a 20-mile ditch to convey water to the mines at Lemhi. The ditch is to be ten feet wide at the bottom, will require 6,000,000 feet of lumber in its construction, and will cost about \$200,000. It is expected that about six miles of the ditch will be completed by June 1st next.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AT OLETA.—Cor. Amador Ledger, Dec. 25: Messrs. Campbell and Davis were here during the week, looking after their mining interests. I hear the mill machinery will arrive during the week. The incline is being pushed until bedrock is reached. The gravel measures about eight feet, and prospects are very encouraging. Several adjoining claims have been bought and work commenced upon them, making in all about 60 acres.

ELECTRIC PLANT AT THE ZEILE.—Ledger, Dec. 25: The electric light plant at the Zeile mine is the most complete lighting plant in the county. It is of 55 light capacity. Only 32 lights, however, have been fixed, as to run the plant to its full power would require more water than the mill batteries take, and to buy water specially for lighting would cost considerable more than under the old system. Some trouble has been experienced on account of the burning out of the wire film in the lamps, which at once renders them useless. This was caused by shutting off some of the lights and failing to shut off the electric current in proportion. As a consequence the intenser current had the effect of speedily destroying the lamps. About 13 were burned out in the course of a few nights. Of course, it takes some time to get into the way of running any new machinery properly. There is no doubt, when those in charge become acquainted with its working, it will do all that has been claimed for it. It may prove somewhat more expensive than was at first anticipated, but there is no reason to believe at present that it will be more costly than coal oil or gas.

Calaveras.

THE CURTIS MINE.—Mt. Echo, Dec. 24: Work is now progressing in the Eclipse mine, situated near Smith's Flat, and for the past few years owned and worked by Jos. Curtis, one of the present proprietors. Mr. Curtis bought the mine from M. G. Foster, who worked it successfully for a long time. This mine is located in a rich mining section, and is beyond doubt, a valuable property. The main shaft is something over 40 feet deep and the vein at the bottom is over six feet wide, all good milling ore. The mine is also tapped by two tunnels running in opposite directions, one 200 and the other 300 feet in the hill, both of which are in good ore. Some 200 feet southwest of the main lead is a shaft over 50 feet deep, in which is developed a vein of rich ore nearly seven feet in width. It is not what is known as a pocket vein, but a genuine milling lead of great value. Thos. Lane Jr., and Geo. Stickle have the contract for building the mill and timbering the shaft. At present, every preparation is being made for operations to begin at the earliest possible moment. The mill will probably be running in three or four weeks. Mr. J. F. Curtis is the Supt., and as he is thoroughly versed in mining, some fine developments may be expected.

El Dorado.

JONES HILL.—Cor. Georgetown Gazette, Dec. 25: The Jones Hill gravel mine is now running in full force under Manager Stanton. The Golden State quartz claim is once more booming, good prospects having been discovered.

Los Angeles.

ACTON.—The Register, Dec. 25: Messrs. Griffin, Johnston, Hollister, Beekman and others have bought out the interest owned by Messrs. Guiberson and Green in the Padre and Neva mines, on Mt. Gleason, and work will be commenced soon on the erection of an addition to their present stamp-mill of five more stamps. This will make the largest mill on the Gleason. These are among the best mines in Southern California, and with proper management, will turn out plenty of bullion. The company will at once put on a gang of men. The Union M. Co. will put in a large pump, and sink farther on their shaft. A little too much water to hoist out by hand. This company has rock that runs \$22 to the ton, and is very easy to get at. Eugene and Bruno Nickel have taken a contract to do the assessment work on the Mammoth mine, owned by Mr. S. Savage of Monrovia, California. This mine is about three miles west of Acton. The New York mill has a lot of quartz on the dump, and when all the machinery is in proper shape, work will be resumed. The Red Rover mine and mill is getting ready for a big run.

Mono.

THE SUMMIT.—Bodie Miner, Dec. 18: Supt. John W. Kelly has put a force of men at work on the Summit. That this mine has been idle so long is a mystery to those familiar with the property. In the flush days of Bodie, the stock was selling on its merit for \$10 a share. It joins the Standard on the east and the Bodie on the north. It has a fine large hoisting works, with all the necessary machinery to carry on an extensive system of prospecting. The shaft is down 600 feet, and the ledge drifted on at the 100, 200 and 400-foot stations. In the upper levels, the ledge is somewhat small and broken, but at the 400-foot level the various stringers unite and form a compact, clean body of ore nearly three feet wide, which assays very high. When this body of ore was first discovered—nearly 12 years ago—it was not considered a paying proposition owing to the high price of milling then prevailing here; but with the reduced cost in that direction, we are now fully convinced that it can be made to yield handsome profits. William Irwin, the well-known mining man, was at one time superintendent of the Summit, and it was his favorite mine, he making the prediction that some day its bullion output would equal that of any mine in the camp. The work at present being done consists in cleaning out and re-timbering the shaft.

THE BODIE CON.—Bodie Miner, Dec. 23: During the past week east crosscut No. 1, 700-foot level, was extended 16 feet. Upraise above the 500-foot level was extended 12 feet. In this upraise there is 12 inches of good milling ore. There were employed 7 miners, 1 carman, and jointly with Mono 1 engineer, 1 blacksmith, 1 assayer, 1 carpenter, 1 laborer, 1 watchman, 1 foreman.

THE MONO.—During the past week south drift, 700-foot level, was extended 7 feet. Upraise No. 2 from above drift was extended 10 feet.

Napa.

TUNNEL.—Calistogan, Dec. 23 When work was resumed on the Sunnyside mining claim, owned by Zell & Simmons, a tunnel was begun in a new place, and has now been extended over 40 feet. It is supposed the ledge will be cut after drifting from 60 to 80 feet farther. The hillside is very steep there, and 100 or 120 feet will give them considerable depth. The old tunnel of the Black Bear mine, in the Pine Flat district, has all been cleared out, retimbered where necessary, and is in good condition for business once more. Many feet of the tunnel had broken the timbers and caved, and of course much hard work was necessary to get it in order again. It was ascertained that the old tunnel had been run just 257 feet. Now that it is open, all work will be done through it. In fact, as the shaft has caved, the tunnel affords the only way into the mine. The tunnel to the Knapp Consolidated mine, in Horn canyon, has been advanced to a distance of 285 feet, and the rock continues very hard.

Nevada.

MERRIMAC MINE.—Grass Valley Union, Dec. 24: Good progress is being made with the new hoisting works on the Merrimac mine. The building is erected and the boilers set, and the next thing will be to place the engines in position. The old tunnel has been reopened, and in a crosscut a vein 15 inches in width has been struck from which quartz is being taken and a crushing is now being made at the Peabody mill. The quartz looks well, and it is found that it is of a paying quality there are hicks of over 100 feet that can be worked. This is not the main vein, however, which the company is seeking to reopen, and which is very strong, as much as 15 feet in places. That vein was worked upon over 25 years ago, and there was a considerable yield of gold, but the shaft was only sunk to the depth of 300 feet, and the bottom level was only opened a short distance. The developments in the Merrimac will be watched with interest, as the probabilities are very encouraging that it will develop into a good mine.

QUARTZ AND GRAVEL.—Nevada Transcript, Dec. 23: A quantity of ore taken by Lord Housman from the recently discovered back ledge at the Sneath & Clay mine was crushed at Locklin's mill this week and gave good returns. The Federal Loan is producing ore faster than the mill can crush it and the stoppers have been laid off this week to give the stamps chance to catch up. The mill that is being built at the Harmony to crush the gravel will be started up next month if no unforeseen delay occurs. Messrs. Stow, Watson, Brand, Marsh and Walrath will soon start to sink a perpendicular shaft on the Yerba Buena claim which adjoins the Fountain Head on the east. The West Harmony Co. has turned its tunnel to the west and in a short time will make an upraise to the channel. Frequent borings made of late have indicated the presence overhead of pay gravel and plenty of it. John and William Kistle and James Russ are opening up the Green Mountain claim between the Murchie and Federal Loan. Their tunnel, which is six feet in the clear and well timbered, is in 75 feet, and it is expected that within 150 feet more the pay chute will be encountered. The ledge, which is from 18 to 25 inches thick, was worked years ago to a depth of 115 feet by Columbus Johnson, the Murchie family, Wm. Kistle, Sr., and others, who took out over \$75,000. The ore paid from \$18 to \$30 a ton, but the miners of those days did not think that rich enough to fool with. The tunnel now being run will tap the ledge 40 feet below the deepest of the old workings.

STRUCK GRAVEL.—Herald, Dec. 23: The Central Co., near the Central House, has struck its gravel and finds it rich. The tunnel, which was run to strike and drain an old shaft which had been sunk to the channel, is found to be too high; but they have struck the gravel and will follow the bedrock down to the shaft, where a pump will be put in to raise the water to this level instead of raising it to the surface. They have a dump, sluices and ditch all in readiness, and hope to get out enough gravel to pay for further developments.

THE PUMPS STARTED.—Supt. Davis has now gotten things in working shape at the Providence. The air compressors and underground machinery are now running, and to-day the pumps were started. Every one will be glad to see the old Providence running again.

RICH ORE.—James Nickerson shows some splendid rock from the Nickerson ledge, on the north fork of Diamond creek. The rock is heavily sulphuretted and fairly alive with free gold. It is probably worth several hundred dollars per ton. Mr. Nickerson says he has three men at work at the mine, which is about half way between the Yuba and Eagle Bird, and that the ledge is eight feet thick.

Placer.

THE DRUMMOND MINE.—Newcastle News, Dec. 25: The Drummond mine, owned and operated by Charles F. Reed, and located between Forest Hill and Iowa Hill, is developing into one of the best mining properties in this part of the State. The shaft or incline is now down 321 feet, and shows an ore body over four feet thick. This whole ledge is producing an average of \$10 per ton, including all the rock that is hoisted out, without culling. The ore carries very little rebellious metal, and the gold is therefore easily saved. The mill has a capacity of 24 tons, and the pay-roll contains the names of 28 employees. The mine has just closed down for the holidays. The cleanup, after a run of ten days just before closing down, showed a yield of \$2100. The present mode of working the mine is more expensive than it ought to be, owing to the fact that all the ore and waste has to be hoisted from the shaft, then hoisted along an incline, and thence to the mill above, which was built on its elevated site at the time the mine was first being prospected. Mr. Reed now has in contemplation the running of a tunnel from the ravine below, so as to tap the mine on the lower levels, and thus cheapen the cost of extracting the ore, and at the same time afford perfect drainage to the mine.

Plumas.

REACHED THE LEDGE.—Bulletin, Dec. 24: From John P. Richards, who was in town last week, we learn that, several days ago, he reached the ledge in the mine at Newtown Flat, owned by Mr. Wormley and himself. The tunnel was driven in 330 feet and it taps the ore vein 140 feet deep. This tunnel has command of about 300 feet of the ledge, with backs of from 140 to 400 feet. The vein is three

feet wide and it prospects well. That section has been rich in placer gold which doubtless came from the quartz veins in that section.

BUTTERFLY QUARTZ MINE.—From H. W. Kellogg of Spanish Ranch, who was in town last week, we learn that Smith & Co. have a prospect for a good mine at Butterfly Valley. Greaves and Maxwell have a contract for running a tunnel, which is now in 260 feet. They have 50 or 60 feet yet to go to reach the ore vein. The tunnel will tap it about 200 feet deep. At other points, the ore has prospected well, and Mr. Kellogg is certain that the vein, which is from 7 to 8 feet wide, will prove to be fine milling ore. Should this operation prove to be the success which is now confidently expected, it will be the commencement of an era of quartz mining in that section. Many veins in that locality will be prospected and others discovered.

Siskiyou.

GOLD.—Yreka Journal, Dec. 23: A man named Burlington has been taking out considerable gold from a rich ledge on Ash creek, a tributary of Klamath river, about six miles below Henley, pounding the quartz in a hand mortar. He realized about \$2100 during the week before last, and the smallest amount realized has been \$600 in a week. The indications are very favorable for the ledge being permanent and not simply a rich pocket. Fowler & Pool also have a very rich ledge on same creek, specimens from which seem almost like pure gold. They will take out a fortune, no doubt, from this claim, even if it should only prove to be a pocket. Parties from the Phil Mott claim and others intend commencing work again in opening river claims above and below Ash creek next spring, and especially at Oregon Bar, where good prospects were found some years ago. James Ironsides of the Cherry Creek quartz ledge realized \$18 per ton from a lot of quartz crushed in the Diggles arrastre at Deadwood lately. He also sent sulphurets from the tailings below for an assay, the returns from which showed a percentage to the ton of \$1,266.26 in gold and \$16.95 in silver, or \$1,313.24 in gold and silver. This ledge is on Deadwood mountain, and extends from Greenhorn creek to Cherry creek. Mr. Ironsides owning three-fourths interest and our City Marshal, Maben, the other fourth. Mr. Ironsides has some other rich ledges on Cherry creek, in one of which F. J. King is interested, but the others are owned by himself alone. The incline at the Willow creek coal mine is now down to a depth of over 300 feet, where a fine bed of coal has been found, measuring four feet in thickness. The company will probably put in a pump soon, as the water coming in exceeds 400 gallons an hour. At present, the water is hauled out by the water cars, four times an hour, the car-box holding about 100 gallons. With a pump, the steam engine can be used in hauling coal cars exclusively. Lee, Lash & Co. of the Greenhorn Creek blue gravel claim have their new shaft down about 75 feet, and expect to strike bedrock in 25 feet more, so as to put in pumping machinery for drainage. They expect to find the blue gravel fully as rich as at the old shaft farther up the creek from the stage road, just south of Yreka. The quartz, placer and hydraulic miners are very hopeful of good success this winter, and during next spring and summer, in mining operations, as the snowstorms already will be the means of supplying a great amount of water in the various streams and ditches for filling sluices and turning wheels of the quartz-mills. We have had more than double the amount of snow already than during last winter, with a likelihood of considerable more before next March, or else rain, which is just as good, from the fact that when raining in the low valleys, during winter, snowstorms almost always prevail in the mountains, where it proves a valuable fountain for streams during the warm spring and summer days.

Tuolumne.

CRYSTALS.—Tuolumne Independent, Dec. 26: Wis Dorsey received by express a diamond which he had sent to San Francisco to be cut and polished. The gem was found in the Eureka mine at Summerville, and is of the kind known as deep water crystals. It is very handsome, Henry Munroe and Tom Birney, owners of the Austrian claim on Bald mountain, near Sawmill Flat, were in town this week, and exhibited some very handsome specimens of crystallized gold. They struck a pocket, a few days ago, and took out a little over \$1100. Hank Gale found a piece of ore worth \$16 in his mine on Jackass hill, Tuesday. Wm. Holmes of Jackass hill struck a bunch worth \$45, on Monday. The drift from the Bonanza slope is now in 65 feet, and is within 60 feet of the west crossing. It may be interesting to distant readers to learn that this mine has produced over \$1,000,000, over \$100,000 having been found in one bunch. The proprietors of this mine seem to have pocket mining down to a science. The mill will no doubt produce largely in the years to come. It is situated in Sonora.

AT ARRASTREVILLE.—Cor. Tuolumne Independent, Dec. 26: The several chutes in the Donella mine are several hundred feet in length. The formation is slate on both walls. There is no machinery of any kind on the mine, but with small capital it can be made a big property. The Blue Lead is in slate formation similar to that of the Donella mine, and it was also first worked in early days, the ore paying well. Some work has been done of late, but owners have not the means to put up the machinery and work it as it should be.

The Uncle Sam mine is looking well. It is hoisted from R. Marshall of Sonoma, by Thos. W. Marshall and sons, Thos. and George. This mine was worked years ago and top taken out and left to cave in and fill up with water. Good reports caused Mr. M. and sons to open it up, and they have a shaft down 90 feet. The ore taken out shows considerable gold, and sulphurets, which assay well; the vein is two feet in width. They have in the past few weeks put up a whim. On the Last Chance mine a shaft has been sunk 50 feet in depth and we are informed that the vein is 18 inches. At the Easton mine, which is in granite formation, the shaft is now down to the depth of 200 feet, and fine ore has been taken out. The vein is not of a large size. There is a hoisting and pumping plant and five-stamp mill in the mine. The Basin Slope mines are idle, but a five-stamp mill has been purchased, and it is said that it will be put up on the mine the coming summer. The Keltz mine is now being worked by an English syndicate. They have a large vein in this mine and in slate formation. They have a ten-stamp mill on the property, and it is said to be

paying well. This mine is situated about nine or ten miles from Soulsville. The Virginia mine has been idle for some time, the owners not having the means to open it.

Ventura.

SANTA PAULA.—Chronicle, Dec. 25: A new rig is completed for No. 13 in Torrey canyon. In the Adams canyon, they have a "crook" in well No. 28, at a depth of 250 feet. In well No. 1, Kenyon claim, the drills are down 1500 feet. Well No. 12 in Torrey canyon is down 500 feet. It has an output of oil of 12 barrels per day. In the Sespe district, well No. 2 on the Los Angeles claim, they are now drilling a depth of 140 feet. They are still fishing for tools in well No. 32 on Tar creek, at a depth of 350 feet, and have a crooked hole also. Charles Maas, superintendent of the ink manufacturing business, is in fine cheer over the prospect of making splendid ink in Santa Paula. At Bardsdale, the oil company's well No. 2 is about ready to begin boring, the derrick and machinery being moved from the abandoned one.

NEVADA.

Washoe District.

IMPERIAL.—Virginia Enterprise, Dec. 24: The raise from the 400 level is up 108 feet, having been made during the week. The top shows quartz having no value.

CONFIDENCE-CHALLENGE.—The joint Confidence and Challenge north drift, 200 level, is in 919 feet, having been advanced 10 feet during the week; face in quartz of no value. The joint Confidence and Challenge north drift on 300 level is in 610 feet, 22 feet having been made during the week; face in quartz of no value.

YELLOW JACKET.—Shipping to the Vivian mill about 35 tons of rock daily. Usual prospecting being done.

CROWN POINT.—East crosscut No. 3, 500 level, has been advanced 34 feet during the week, and is now out a total distance of 34 feet; face in quartz of low grade. The west crosscut from the south lateral drift, 600 level, has been advanced 27 feet since last report, and is now out a total distance of 330 feet; face in hard porphyry.

KENTUCK.—The east crosscut from the north lateral drift, 500 level, is out a distance of 26 feet, having been advanced 13 feet during the week; face in a mixture of porphyry and quartz giving low assays. East crosscut from the bottom of the 1000 level north winze was advanced nine feet during the week, and is out 46 feet; face in porphyry and low-grade quartz. Are still following south on the ore streak from the 1000 level raise, with no change to report during the week.

JUSTICE.—The raise from the east drift, 622 level, was advanced 11 feet during the week. The top is in a mixture of clay and porphyry. The south drift from the top of the raise, same level, was advanced 16 feet during the week, the work making its total length 46 feet; face shows bunches of fair-grade ore. The north raise on the 622 level was advanced 10 feet since last report, and is now up 46 feet. The top is in low-grade quartz.

SEG. BELCHER.—The north drift from the west crosscut, 600 level, is out a total distance of 76 feet. The face is in a mixture of porphyry and quartz giving low assays.

BELCHER.—The raise from the lateral drift, 300 level, was advanced 30 feet during the week. The top is in a quartz assaying from \$8 to \$12 per ton. Are saving from 10 to 12 tons of fair-grade ore per day from the south drift from the 6th floor of the raise above 1300 level.

HALE AND NORCROSS.—On the 1630 level the north drift is advanced 115 feet. East crosscut No. 1, started from the north drift at a point 75 feet north from the station, was extended 20 feet, making its total length 55 feet. On the Sutro tunnel level the south drift was advanced 25 feet, making its total 190 feet. West crosscut No. 1, started from the south drift, 100 feet south of the station, was advanced 15 feet, making its total distance 90 feet. There is no change of importance in any of the drifts or crosscuts since last report. Have sent through the Sutro tunnel 574 cars of waste rock during the week.

SAVAGE.—During the week we have hoisted 697 cars of ore from the 750, 955, 1150 and 1450 levels, and shipped to the Nevada mill 525 tons, and milled 535 tons; average battery assay, \$22.88. We have bullion on hand amounting to \$21,443.62. On the 1450 level we are stopping ore of fair grade from the face of west crosscut No. 1. Have also started an upraise in the ore to connect with the northwest drift, 1400 level. On the 1450 level, at a point in the north lateral drift, 90 feet north of our south boundary, we have commenced stopping ore of fair quality.

CON. CAL. & VA. MINE.—1100 level.—From the west crosscut at a point 530 feet in, a south drift has been started and advanced 40 feet in a porphyry formation. Have extracted a few tons of milling ore from between the east crosscuts Nos. 4 and 5. From the south drift, the southeast drift started from the south drift at a point 40 feet south from east crosscut No. 4 has been advanced 30 feet; total length 105 feet in porphyry and quartz carrying a low assay value. 1500 level.—The incline upraise has been carried up 35 feet; total 55 feet; following a narrow ore streak, and some milling ore has been extracted therefrom. 1600 level.—The various openings on this level continue to yield some ore. 1650.—Have continued to extract ore of fair quality from the drift run west from the top of the upraise carried up 55 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from the winze No. 3 (down 73 feet) in working upward from that point. 1750 level.—In working out and upward from the bottom of winze No. 2, sunk from the 1650 level, we continue to extract ore of fair quality. Have also extracted some milling ore at the point where the upraise carried up from the crosscut run west from the southwest drift made connection with the slopes on the eighth floor. Have continued to extract ore of average quality at the point where the upraise from the southwest drift 70 feet north from the south line of the California ground connected with the eighth-floor slopes. 1800 level.—The south drift on this level has been extended 10 feet; total length 32 feet; and continues in ore of milling value. There has been extracted from all parts of mine during the week 1043 1440-2000 tons of ore, which was shipped to the Morgan mill. The average value of all of the ore worked at that mill during the week, 980 tons, was \$24.55 per ton. Bullion shipped

to Carson mint, assay value, \$36,710.39. Bullion no hand at in our assay office, assay value, \$12,000.

Pioche District.

IN THE BURKE.—Pioche *Record*, Dec. 19: It is with much pleasure that the *Record* announces the arrival of Mr. Geo. H. Gould of Santa Barbara, Cal., who, in company with Mr. and Mrs. W. S. Godbe, arrived this week. Mr. Gould came to Pioche for the second time in the interests of the P. C. M. & R'd Co. At the time of his former visit, some three years ago, the South Contact vein in the Yuba had been struck, from which some 300 tons of free smelting ore was shipped to Salt Lake, having from 150 to 300 ounces silver and one ounce in gold per ton, and also running high in lead. We are informed that a far more important development has just taken place in the Burke mine, one that promises to give the camp a fresh impetus and add greatly to the richness of the company's future bullion product.

Wild Rose District.

OUTLOOK FOR THE OLD CAMP.—Cor. *Silver State*, Dec. 26: I visited Spring City a few days ago and found the people there hopeful and confident. They are beginning to see a glimmer of light through the darkness that has shadowed that camp for the past three years. T. F. Maley and Mike Menzies have a lease on the Bullion mine and have struck a body of very rich ore, carrying considerable native silver, and which will mill at least \$100 per ton. N. Frayer has opened up the Cliff mine at the south end and has found the ledge there three feet wide of first-class ore, which will mill from \$700 to \$1500 per ton. The ledge is getting wider and richer as they go east, and it looks as if they were running into a large body of ore. It is needless to say that this makes Nick feel very good, which is shown by the fact that he can tell his yarns now as he used to years ago when times were good. Wm. Weighel has a force of men prospecting the Julian mine, which has a good ledge about 2½ feet wide. Half of it is \$150 to \$200 per ton. Mr. Weighel showed me an assay that he had made in San Francisco which went \$200.84. The ledge is getting larger as they go north. The owner says he will increase the force after the first of the year and take out a carload of ore for shipment. There are several other prospects that are looking quite well, and the miners look for a boom in the spring, which there is no doubt they will have, judging from the looks of the mines now.

ARIZONA.

RICH GOLD STRIKE.—Phoenix *Gazette*, Dec. 26: Harry Horseworths came down from Weaver district yesterday. He reports a rich strike in the Piacer diggings up there, and nuggets weighing four and seven ounces are being taken out. A Mexican who had been working in the lower end of the district struck a rich "pay streak" the other day, that caused a general stampede to the spot, and claims were staked off in every direction. There were several hundred dollars of gold dust brought into Phoenix and sold to Goldman & Co.; some of the nuggets brought in weigh six ounces. There have been thousands of dollars of the precious stuff taken out of these diggings in years past, but there has never been such a rich strike as this one made before. There are more men working in the district this winter than there have been for years, and they are all making fair wages. Including Americans and Mexicans, it is estimated that at least 175 men are placing, besides a large number of quartz miners and prospectors, who are meeting with more or less success in their search for the hidden treasure.

DAKOTA.

SOUTHERN HILLS.—Deadwood *Pioneer*, Dec. 20: Titus Corkhill, State Inspector of Mines, returned yesterday from an official trip to the Southern Hills. While there, he visited the Keystone mine, and is enthusiastic over the prospect. He says the character of the ore is similar to the Homestake, only richer. He thinks it will prove one of the best mines in the country. At Spokane and Silver City, he found great activity prevailing. A number of ledges of high-grade pyrites has been uncovered, and the owner feels confident of supplying the basic ores necessary for the treatment of the silicious ores of Bald Mountain and Ruby Basin.

IDAHO.

BEAVER DISTRICT.—Cor. *Idaho Statesman*, Dec. 26: The Elmira mill at Banner is making a splendid record this year, the yield being from 4000 to 4500 ounces silver bullion per week. Beaver district, sometimes known as El Dorado, will be the district to start a boom for this county when spring opens. Silver ore was first found there in 1889, by A. W. Dunn, who recorded five claims on July 5th. He commenced work on them, and during the fall sent a few tons of ore to Banner that milled nearly 400 ounces of silver per ton. A good many locations were made in 1889 and 1890, on 30 of which representation work has been done. The owners of the principal mines in the district are A. W. Dunn, M. H. Kempner, Vivian Thorne, Dr. Southworth, D. W. Brown, Charles Curtis and John Henry. They have done a large amount of work on their claims and developed many wonderful silver mines, as well as several mines on the gold belt, half a mile south of the silver veins. These mines are ten miles southwest of Banner, and in the right direction to be on the same belt. They are on a direct line between the Banner and Summit Flat mines. All of the gulches of the district carry large streams of water the year round, and the finest timber for lumber and mining purposes is abundant; in fact, the mines are surrounded by a dense forest of pine and fir. These persistent and energetic prospectors have done well in developing such a fine lot of mines without financial assistance from the outside. But the time is certainly near at hand when they will reap rich and justly earned rewards.

RED CLOUD MINE.—Wood River *Times*, Dec. 23: The downward continuation of the ore body in the Red Cloud mine was cut into last night on the lowest level. At noon to-day the ore vein showed a width of 10 inches of first-class shipping ore of as good grade as any extracted from the property. This find was made in a crosscut, began the first of October last, to discover the continuation of the vein lost because of a break or fault in the formation. This discovery is of great importance to

the owners, as it enormously enhances the visible value of their property and justifies the hope that the payment of dividends can be resumed ere many months.

LOWER CALIFORNIA.

THE BUTLER MINE.—Lower *Californian*, Dec. 18: Mr. E. A. Brennan, the mining expert, has returned from a visit of inspection to the Alamo district. His main object was to examine the Butler group of mines on Tomasa hill, and he expresses himself as greatly pleased with them. They are, in fact, greater properties than he had been led to expect, but the little development that has been made on them shows nothing more than a lack of ability on the part of men who have thus far had the mines in charge. To illustrate; Mr. Brennan says he saw two drifts parallel with the ledge, and one sink through 16 feet of granite, also parallel with the ledge. He thinks that by proper work the Butler mines, especially the Arabella, will prove to be the richest mines in the camp. His idea would be to strike into the formation to a depth of perhaps 800 feet at which point he is confident an ore body would be encountered. Drifting at that depth would tap most of the Butler mines. As to the camp in general, Mr. Brennan believes that its richness is plainly apparent, though but little development has been made. Mr. Brennan was sent to Alamo by two well-known capitalists of California, with instructions to examine and report on the Butler mines, and we have it on pretty good authority that his report will result in the development of those mines on a large scale.

MONTANA.

WHITLATCH-UNION CONS.—Helena *Journal*, Dec. 23: No mining transaction consummated during the present season is of greater importance than the consolidation under one control of the entire unexplored portions of the Whitchatch, or McIntyre, Union vein of free-milling gold quartz located in the mountains four miles south of Helena. Through unremitting perseverance of Michael Cooney, all the segregated unexplored portions of the original vein, as well as the adjoining properties on the north, west and east, of any present or possible future value, have been acquired, and the statement is understandingly made that the proposition as presented forms the basis of as great a mining enterprise as was ever inaugurated in the country. It is an incontrovertible fact that portions of this vein produced gold bullion to the value of millions, at a time when labor was high and the cost of all supplies was, as compared with to-day, most exorbitant, and it is surely a fact that but a small part of the vein was opened, and that in those portions from which ore was extracted, the vein was not followed to any considerable depth. W. G. Bailey, who is noted for being one of the most conservative business men, has taken hold of this matter, and intends to give it all needed attention until brought to a successful issue. Most careful estimates have been made to ascertain the means required to place the property upon a paying basis, and it has been found that \$35,000 will be ample.

NEW MEXICO.

JIGS.—Southwest *Sentinel*, Dec. 29: Walter C. Hadley, on the Graphic, and U. E. McDaniels on the Flower Queen, are preparing to concentrate the low grade ore at Cook's Peak by jigs. This is a very cheap and thorough way of concentrating and should be generally used throughout Grant county. The old McGregor mill at Georgetown is running along steadily with one full 12-hour shift a day. If more snow or rain fall, the mill will be run continuously throughout the 24 hours. Mr. Bragaw expects to ship two carloads of concentrates and ore next week. The Lone Mountain M. Co. are now steadily sending in ore to Silver City for treatment at the Grant County M. & M. Co.'s works. The Lone Mountain Co. expect to continue their shipments here all during the winter at an average rate of ten tons a day.

SALE.—Another mining deal, consideration \$20,000, was consummated in Silver City on Saturday. Mr. Nestor, representing a New Orleans syndicate, and Philip Bach, Jr., representing the owners, met here and drew up the papers. The property is the Ann Arbor mine on Silver Creek, and is the western extension of the Confidence mine. The new owners will put a force to work at once opening the large vein they have. When they have ore enough blocked out to justify them in so doing, they intend to put up a large mill in which to treat their output. Judging from this (and the test is a good one) the new company is a sound business proposition, and is not intended to be run as a stock jobbing operation, as too many valuable mines in this part of the country have been before.

ST. HELENA.—Silver City *Enterprise*, Dec. 25: A force of men will be put to work on the St. Helena mine, Central district, the first week in next month. The St. Helena is showing one of the largest bodies of ore of any mine in the county.

The Old Abe mine at White Oaks is a bonanza, much to the delight of those who for years have pinned their faith to the camp. It is claimed that in a new strike recently made, that there is a million dollars worth of free milling gold ore in sight.

N. Bell informs the *Enterprise* that he will receive a car of ore every fourth day from the Golden Rule mine, near Dragon Summit, Arizona. The ore will be hauled to Pinos Altos and worked in the Bell & Stephens mill.

Another large mining deal was consummated last Saturday, the Ann Arbor mine at Mogollon, Silver creek, changing hands. The purchase price was \$20,000 cash and a large stock consideration. The deal was promoted and effected through the untiring energy and efforts of Judge Ed. Nestor, of Silver creek. The fortunate locators, Dan. W. Lannan and Philip Bach, Jr., receive a well-earned reward for years of unremitting toil in the mines. The Sunset Mining company, of New Orleans, is the lucky purchaser, and has acquired a most valuable mine. The two veins within the company's ground are known to be among the best mining properties in the west, and the new company bought the property at a small price compared with other properties adjoining, or compared to its real value. There is little doubt of the success of the new venture, and it will, when the mill is built, lend new impetus to the mining business in that section. Development work will be started about January 15th.

UTAH.

THE JUPITER.—Park *Record*, Dec. 27: The Jupiter has been closed down for the winter after a most successful season's run. The lower tunnel was driven until it has reached a total of 862 feet, a large portion of the ground being about the hardest rock ever encountered in this camp. At a point 827 feet from the mouth, the large fissure vein was encountered and crosscut and found to be 28 feet wide, filled with low-grade ore and fine-looking vein matter.

CAMP CROSSCUTS.—Considerable ore is being taken from the upper works of the Alliance and stored. The roads are now in splendid condition for hauling, and the mines are making the best of it, and ore is rolling down in large quantities. It is rumored about town that a wealthy English syndicate is endeavoring to secure control of a large piece of valuable ground in the Park with the intention of forming a stock company and working the same. Business at the sampler has been rushing this week, and if the roads remain good, which they probably will, a night force will have to be put on to keep up with the procession. The McHenry, one of the oldest locations in the Park, again comes to the front this week as a shipper. The Nevada-Northland leasers, nothing daunted by the hung jury in their case, are going to put a force of men at work to prove more fully that they have the apex of the disputed vein. The case between them and the Mayflower folks will probably be called about the first thing next term of court. Prospecting is still the order of the day at the Tybo, all work being confined to drifting for the ledge. The shaft is down 220 feet deep, and in the estimation of several parties who are thoroughly acquainted with the formation of the hill, should be at least 100 feet deeper.

WASHINGTON.

TURNING OUT \$8000 A MONTH.—Okanogan *Outlook*, Dec. 23: The Black Bear is a bonanza indeed. In the shaft, which is now down 110 feet, they have 22 inches of ore that assays 42 ounces in gold, which, rated at \$16 an ounce, would mean \$752 a ton. Enough development has been done to demonstrate the permanence of the ore chute and place the Black Bear among the best properties in the county. Drifting both ways from the 100 foot level continues in the same rich ore as encountered in the shaft. Mr. Silverman took to Spokane this week six bars of bullion, the value of which is between \$5000 and \$6000, as the product of 16 days' run on Black Bear ore. In the five months this little five-stamp mill has been in operation it has turned out on an average about \$8000 a month in gold alone. Besides paying for all development done this season and the expense of putting in the mill, it has accumulated a surplus of funds in the treasury of the company, which will be expended during the winter in developing the mine for a larger output of ore and increasing the capacity of the mill.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING DEC. 22, 1891.

465,690.—VEHICLE SHAFTS—J. R. Brought, Mojave, Cal.
465,755.—WEATHER STRIP—S. R. Deacon, Electric, Cal.
465,494.—FIRE ESCAPE—E. W. Dixon, Forest Grove, Or.
465,615.—REFRIGERATOR CAR—E. T. Earl, Los Angeles, Cal.
465,530.—HOOK—R. L. Kirby, Pomeroy, Wash.
465,624.—HYDROCARBON BURNER—J. R. Morse, Los Angeles, Cal.
465,490.—MUSICAL INSTRUMENT—A. Olson, Mishawaka, Or.
465,491.—TRACTION WAGON STEERING APPARATUS—J. B. Osborne, Daggett, Cal.
465,566.—EXTENSION JOINT FOR URINALS—Jas. Shepard, S. F.
465,769.—STEAM ENGINE—C. W. Tremain, Portland, Or.
465,370.—SPEEDING AND REVERSING GEAR—F. E. Tremper, S. F.
465,738.—EXCAVATOR—J. H. L. Tuck, S. F.
465,741.—HAIR-WORKING MACHINE—G. A. Williams, San Diego, Cal.

The following brief list by telegraph, for Dec. 29, will appear more complete on receipt of mail advices:

California—Hans C. Behr, San Francisco, instrument for measuring units of work done by a machine; Frank C. Colville, Oakland, electric annunciator; William A. Brown, San Francisco, wrapping machine; Henry Elliott, Los Angeles, lock; C. I. Hall, San Francisco, valve for hydraulic elevators; Adam Heberer, Alameda, steam boiler; James L. Henderson, Alameda, motive engine; Charles B. and T. D. Hunt, Winters, truck; Alden B. Kelbarr, Oakland, and C. Young, Sacramento, metallic packing; John C. Look, San Jose, car coupling; George E. Woodbury, San Francisco, ore concentrating machine.

Arizona—Wm. H. Ayres and H. Schroeder, Whipple Barracks, bow-and-stringed instruments.

Oregon—Jonathan W. Hunt, Kirby, memorial burial tablet and indicator.

Washington—Caleb D. Page, Tacoma, dumping trap.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

EXTENSION JOINT FOR URINALS.—James Shepard, S. F., assignor to Shepard Bros. No. 465,566. Dated Dec. 22, 1891. In the usual construction of urinals a supply pipe is connected with the upper end of the bowl, which is usually made of earthenware, and the discharge pipe is connected with the lower end, these pipes having sockets, into which the extensions from the upper and lower end of the bowl enter, and are fixed and made tight by means of any suitable cement. Whenever it is necessary

to remove the bowl, or make repairs, the couplings and connections of these pipes have to be torn out, and there is considerable trouble, time and expense in removing and replacing them which this invention is designed to overcome. The extension joint is so made that the bowl may be readily removed without disturbing the connections.

SPEEDING AND REVERSING GEAR.—Frank E. Tremper, S. F. No. 465,570. Dated Dec. 22, 1891. This invention relates to that class of mechanism for reversing the movement of an engine, usually termed "speeding and reversing gear." The object is to provide a simple and effective gear of this class which is specially adapted for small boat engines, in which the driving shaft of the engine may be placed transversely of the boat, and may communicate power to the screw shaft, which is located longitudinally thereon.

Mining Share Market.

The year closes on an inactive market, but at fairly steady prices. By referring to the list of lowest and highest prices it will be seen that fluctuations have been very small, leading persons to believe that the pools are taking in every share of stock possible, while making the market look sick and giving it every appearance that a break is at hand. Points put out are for lower prices and then a big up, but cappers and their tools (fools) do not say whether it is to be a sharp break or a gradual decline.

On Dec. 31st, 1890, sales made on the 9:30 A. M. session of the S. F. Stock and Exchange Board were at the following prices: Alpha 80 cts., Andes 60 cts., Belcher \$1.30, Best and Belcher \$1.90, Bodie 70 cts., Bullion \$2.25, Challenge \$1.40, Chollar \$2, Con. Virginia \$2.10, Crown Point \$1.05, Gould and Curry \$1.25, Mexican \$2.10, Ophir \$2.60, Overman \$1.55, Potosi \$4.80 to \$4.85, Savage \$1.40, Seg. Belcher 80 cts., Union \$1.50, Yellow Jacket \$1.65. In May, or 4½ months afterward, Con. Virginia sold at over \$20 a share, Best and Belcher at \$9.37, Gould and Curry \$4.00, Mexican \$5.37, Ophir \$9.50, Potosi \$4.55, Union, \$5. The Middle and Gold Hill stock did not move up much in comparison to the North End stocks' up move.

It is still claimed in well-informed mining circles that the Bodie mining companies outside of the Standard are not conforming to the laws of this State. The officials of the mines in not doing so are liable to prosecution for criminal negligence, as well as civil suits. Dummy directors, elected through the pernicious proxy system, it is said do not care how superintendents' reports are made so long as they draw their \$5 fees for attendance at called or regular meetings of the directors.

While the year goes out on an inactive mining share market, the condition of the mines were seldom, if ever before so favorable for extracting ore at a profit, so as to allow dividends to be paid, and dividends will be paid, provided mine-losing becomes a thing of the past. No one knows better than those who are members of looking rings, that by the work in the lower levels of the mines, high-grade ore was discovered, and also that in drilling on several levels, it showed an upward continuation. With this knowledge, the mines were flooded, either accidentally or otherwise, which naturally caused outside shareholders to sell large lines of stocks at very low prices, under assessments, and a failure to show up ore. With large lines of stocks on hand, the pools or rings had to devise ways and means to peddle them out at a good round profit, and for that purpose, Con. Virginia was taken in 1886 as a leader, and on its paying dividends, soon after it sold at over \$50 a share. Success crowned their efforts. The result is too well known—assessments levied since by every mining company, excepting Con. Virginia, two dividends by Hale and Norcross, and a few dividends by Confidence. Of course, since 1886 several mines have been and are still being looted to the injury of outside shareholders, but now it looks as if 1892 will witness a forced return to honest mine management and paying dividends from milling ore taken out of the west ledge. Why does not Con. Virginia, Savage, Chollar and other mining companies taking out ore conform to the mining laws of California under which they are incorporated, and give mine assays of ore? J. W. Mackay, in his testimony in the Hale and Norcross suit, admitted that they were a check against looting.

Mining shares opened this morning (Wednesday) inactive but fairly firm. After Call, there was a slight advance, caused by a small buying order for two or more of the Comstocks. The market is very sensitive, and any demand for stocks causes an advance; but after this is met, prices slide off again. In outside mining shares there is very little doing. In the "Razor Blades" (Tuscaroras) and Quijotas there was not a single transaction the past week. There was a short-lived demand for Bodie; what on, no one seemed to know.

The pools and rings' orders, not to let leak out any information of a favorable character from the Comstock mines, are still in force; but notwithstanding this, we are in possession of advices from reliable sources at Virginia that in several of the mines they are opening up the rich ore found to the west. The reticence of the officials of these mines regarding it makes it quite probable that the ore is to be kept for looting, but in this game it is to be hoped they will meet with a Waterloo defeat. In Con. Virginia there is a reported improvement on the 1800-foot level. On the 1100-foot level the reported rich find is kept secret—too far west to answer their purpose. In the other north end mines, developing and exploiting work are still under way. In the middle group, very important work is being done, which, if the mines were differently managed, ought to produce dividends from the ore mined. Potosi officially reports an improvement. A. C. Hamilton, the superintendent of that mine and several others, has begun to take an oath through proxy to the correctness of the weekly reports. Why does he swear by proxy? Is he afraid they are wrong? Proxy oaths are not legal. In the Gold Hill group the important work heretofore reported is still under way. In Alta, on the 1350 level, the large body of ore recently found assayed over \$100 in gold. If the mine was differently managed, there might be quite a boom in the stock.

From the outside mines there is nothing new to report. If official advices from the Quijotas and Tuscaroras are correct, the shares are cheap, provided rings do not get away with the bullion. From the Bodies, private advices are very encouraging,

MECHANICAL PROGRESS.

Railroad Couplers.

One of the most annoying items connected with railroading just at this time is the matter of couplers for connecting cars in long, heavy freight trains. The rapid increase in the length of trains and weight of cars has rendered the draw gear of the average freight car too weak for the work thrown upon it. As a consequence, a large percentage of freight-car repairs is made upon the couplers or draw gear. In addition to the imperfections common to all, there is the additional trouble of the great variety of make. Every railroad seems to have its own preference, and as cars are constantly being transferred from one road to another, the confusion and expense is all the more. Of course, when any defect of this kind occurs to a car on another than its own road, the road on which the break occurs must make the repairs, and the great trouble arises from obtaining a coupling or a drawbar just like the one broken. Of course each road, when a break occurs to a car not its own, will repair the damage in the easiest and most inexpensive manner and send the car along with a "defect card" attached, hoping it may reach its own road before the imperfect substitute gives out.

So great has this trouble become, and so important is it to the security of life and the safety to merchandise, that Congress has been asked to establish some uniformity of couplers—to select some one of the many in use which shall be adopted by all roads.

Senator Onslow introduced a bill into the last Congress providing for the adoption and use of a uniform standard of coupler for all freight trains employed in interstate commerce. This bill provides that all common carriers, whose duties include the coupling of cars, and who are members of established organizations, and their railway employees, may, within six months after the passage of this Act, vote upon a choice of automatic car coupler. Such coupler may be of vertical type; must be so devised as to couple by impact, and dispense with any person going between the cars to couple or uncouple. Every common carrier is to be entitled to one vote for every freight car owned, leased or controlled, and the employees will be entitled in the aggregate to one-third as many votes as may be cast by all the common carriers.

Counting the Votes.

The Interstate Commerce Commission is to have the power to decide the validity of the votes cast if not less than 600,000 votes are cast, and the entire vote for any particular coupler be not less than 500,000. The commission shall certify these facts to the President, who shall issue a proclamation declaring the coupler chosen to be the standard safety car coupler for use in interstate commerce. In case no choice is made the President shall appoint a commission of five competent persons to determine the coupler best to be used. All carriers must equip at least 10 per cent each year of the number of freight cars used, and also equip every engine with a driving-wheel brake. The Commissioners shall invite bids from the inventors of couplers, stating what they will accept from the United States for their patents, and upon the purchase of the patent by the Government the coupler may be used or manufactured by anybody free.

The great difficulty in introducing any new device into railroading becomes very apparent in this instance of the car coupler. A coupler has been recommended by the Master Car Builders which, it appears, is opposed by some labor organizations, not because its use would result in the saving of life, but because it throws skilled labor out of employment, it being held that the old device required skill on the part of the operator, while the new one is practically automatic in its operation. It is just such unreasonable requirements by labor organizations as this that is fast arraiving popular opinion against them. But, aside from any objection on the part of workmen, the introduction of an automatic car coupler presents a serious problem to the railroad companies. If the change could be made on all roads at once, there would be little difficulty in the matter. But as this cannot be, there is the difficulty of coupling cars with all sorts and descriptions of coupling devices, so the whole matter must rest.

PROGRESS IN MACHINERY CONSTRUCTION.

Probably but few have any correct idea of the difficulties which were met with 60 or 70 years ago in making suitable tools and machinery from metal. There were no planing, boring or shaping machines; the turning lathe and the drill-borer were about all the devices which could be called into use by the mechanic of that time. Sewing machines, which play such a part in the manufacture of shoes, could not possibly be made at that time. All inventors had to make by hand the machines they invented, without the aid of other machines in the making of the individual parts. They had to invent some tools so as to be able to make certain parts of their invented machine. When the celebrated English machinist Clement entered a shop as master at London, in 1814, he found the tools so poor and defective that he had to spend days in making such tools as were needed. James Watt, the inventor of the steam engine, could not get his first machines in working order in consequence of lack of some

contrivances. The first cylinder, which he had cast was not tight and was on one end five millimeters wider than on the other. A good cylinder should not show more difference in width than one-half millimeter; and then the cost of work at that time was extravagant. Whitworth, one of the oldest manufacturers of working machines in England, says that the polishing of cast iron cost \$3 per square foot 40 years ago, as the work had to be done by hand. To-day a metal planing machine does better work for 2½ cents a square foot. The first steel pens had to be made by hand. The manufacturer, Perry, paid for the first steel pens \$1.25 a piece, and we often read that steel pens used to cost \$5. But still these pens were not as good in quality as those which are made to-day. After factories had been established, the price of a steel pen was still \$1, then 50 cents, and finally 25 cents, which price was kept up for some time. To-day one can get a gross for that price.—*Metal and Iron Industry.*

AMERICAN LOCOMOTIVES IN ENGLAND IN 1840.—It is quite presumable that the fact is not generally known that there were quite a number of American locomotives in use in England, over 50 years ago. This fact has recently been brought out in connection with the discussion of the relative superiority of the English and American locomotives. It is stated that in 1840, there were in use on the Gloucester and Cheltenham railway in England, twice as many American as English engines, although the first cost of the former, including duty, was somewhat higher. It is to be presumed, therefore, that the American engine of those days was more efficient than the English, and this is all the more interesting because some recent experiments go to prove that the superiority is still maintained. Some of the locomotives turned out by the Baldwin locomotive works are simply magnificent pieces of machinery, and if the compound locomotives of the type built by this works, does what is claimed for it, the American machine will continue to hold its supremacy.

A NEW AND USEFUL MACHINE.—One of the most interesting practical inventions lately put upon the market, is from a knitting machine manufactory in Dresden, Germany, the apparatus in some respects resembling an ordinary knitting machine in its make up. It can be readily employed as such both on round and flat work, but is especially adapted for variegated patterns in their usual diversity. It is capable of working variegated patterns—cardigan stitch, purl cardigan, two-and-two rib, and embodies the peculiarities of a striping machine, producing in one piece of goods single, colored, striped and many-colored patterns, without changing the machine itself. By the simple placing in or out of the back thread in the slotted thread conductor, it is claimed any desired number of colors and shades can be produced, the effect being such as to give the impression that the patterns are the result of embroidery.

THE RUDDER OF AN IRONCLAD.—It is an immense affair. The rudder of the French ironclad *Buenos*, which was recently launched at Lorient, was 18 feet high and 13 feet wide, weighing 17 tons. In transporting it from the shops where it was made, to the shop yard, it was necessary to suspend it between two flat cars, as it could not be placed upon a single car in any position. Even in this position, the rudder just cleared the roadbed, and the arches of the tunnels through which it was necessary to pass. The great rudder was built with an interior framework of wrought steel, iron angles and plates, and covered with steel plates. Great care was required in constructing it, in order to make it perfectly water-tight, for a water-logged rudder would be a very inconvenient and cumbersome appendage to a great war ship.

CHEAPENED FUEL COST IN MELTING IRON.—At the recent meeting of the American Society of Mechanical Engineers, Mr. Webber stated that a considerable saving in the cost of fuel was obtained by melting metal in a foundry cupola rapidly. At the Erie City Iron Works 100 tons of iron was melted per week in a 60-inch cupola, at the rate of eight tons per hour. The ratio of iron to fuel was 7½ to 1. Desiring to increase the capacity of the cupola, an attempt was made to melt 12 tons per hour instead of 8. The result was 11½ tons per hour with a ratio of iron to fuel of 9½ to 1, and 75 per cent of metal went into good castings, or only three quarters of 1 per cent less than with the slow rates of melting.

A NEWLY DESIGNED PULLEY upon which particular attention has been paid to danger from slipping belts, has been placed on the market. On the face of the pulley, at regular intervals, are rubber strips with rounded surface and fastened by projections passing through the rim of the pulley. Not only do these strips do away with slipping belts, but lessen the wear on the latter and reduce the friction to the minimum. When worn out, they can be replaced at a slight outlay.

AN AX is subject to rigid tests before it is pronounced perfect. The steel must be of the required temper, the weight of all axes of the same size must be uniform, all must be ground alike and in various other ways conform to an established standard.

SCIENTIFIC PROGRESS.

Cyclones in California and Elsewhere.

Cyclones of grand dimensions are frequently generated in the zones where the trade wind of the opposite hemisphere penetrates. They are caused by an augmentation or swelling in volume of air, proceeding from the opposite hemisphere, attending unequal distribution of the normal limits of the atmospheric circulation, and determined by the retardation which the trade wind or monsoon meets with in following the sun's movement.

The recent little touch of a cyclone in this city by which a house was demolished and two unfortunate lives lost, brings to the mind of the writer an incident which is said to have occurred near that same locality something over 40 years ago, and before the discovery of gold at Sutter's mill.

An American ship was riding at anchor off the Presidio, over which, at the time, the Mexican flag was flying. One morning, as a gentleman—a passenger—was standing upon the quarter deck, he was surprised by a sudden atmospheric disturbance which originated but a short distance from the ship and upon the water. It took the form of a tornado, or whirlwind, and commenced a movement landward, with a violent whirling motion, and struck the land just west of the Presidio, increasing very instant in violence, until it passed on and over the high ground near what is now Lone Mountain. In its passage, it actually tore up the surface of the ground, filling the air with sand and brush.

The circumstance was first made public by the observer, on a second visit to this State about 15 years ago, through a letter published in one of the city dailies. That letter came under the notice of the writer of this paragraph, who clipped and filed it away. The narrator expressed the opinion that if this city had been built up at the time, as it was at the time of his second visit, not a house could have stood in its track of a hundred feet or so in width.

This incident, and others of a similar character, which have occurred in several localities on this coast within the last 20 years, should be a reminder that California is not altogether exempt from those terrible atmospheric disturbances which occasionally work such havoc to life and property in our Eastern States. One of these California tornadoes occurred near the city of Nevada some 15 or 20 years ago, and passed for some three miles or more through a dense forest. As we now recollect the account, it twisted huge trees as though they had been mere saplings, tearing others up by the roots and making a clean path through the forest, something like a hundred feet in width. Judging from its destructive work, as no human eye saw it, no Kansas or Dakota cyclone ever reached greater violence or destructiveness.

THE ELECTRIC HEADLIGHT.—The use of electric headlights has now become quite general in Indiana, nearly all the roads entering Indianapolis now having several in service. A representative of the *Railroad Gazette* made a trip over the Indianapolis, Decatur and Western, from Indianapolis to Decatur, lately on an engine equipped with the light. Its power is approximately 2500-candle power, and it gives the engine-man a light which on a straight track will often reveal objects at a mile or more, and for fully one-half a mile all objects of the size of a cow can be distinctly seen in ordinary weather. The greatest distance at which an object was seen was 2½ miles. This was a window of a station-house in which no lamps were burning. When the light was first reflected from the window, the appearance was that of a locomotive headlight about a mile away. The window seemed to increase in size until at a distance of about three quarters of a mile, the effect was that of a burning structure. At this distance the outlines of the building could be distinctly seen. These distances were easily computed by counting the telegraph poles, which are 200 feet apart on this road. A water tank was sighted at nearly a mile, appearing much larger than it really was. Bridges with overhead trusses could be seen at half a mile. The highway crossing fences along the line had been freshly whitewashed and with little effort could be seen a mile. Collisions have been prevented by the use of these lights. The expense of running the light is nominal. The demand for steam from the locomotive is small, and the carbons, which last 18 hours, cost but 70 cents per hundred.

LIGHTNING CONDUCTORS.—To the various theories concerning lightning conductors which have been advanced by scientists is now added that of Prof. Rowland, of the Johns Hopkins University, who asserts that the best method is to provide a metal roof with an ample number of metal conductors leading to the ground, serving to carry off the electric bolts from the clouds; copper is the best material, but tin or iron will answer the purpose, and he suggests the placing of the conductors at the corners of a building, so that all parts will be equally protected. Further, lightning has no fixed portion of a building to strike—the stroke may fall at the center of a roof, and, while it runs along the surface of a body, the body may be broken or crushed by the enormous pressure brought to bear upon it, in the same manner that an explosion of dynamite or nitro-glycerine would cause a fracture. The quantity of

electricity in a stroke of lightning, Prof. Rowland remarks, is not nearly so much as passes along almost any electric wire on the street, but the voltage, or electrical pressure, of the street wire is rarely 3000; a volt is the basis on which the pressure is estimated and the voltage of the lightning stroke is roughly estimated at 6,000,000,000 volts—in addition to which appalling difference, it may be said that the current of the wire is constant and continuing, while the lightning dart is delivered in the one two-hundredth part of a second.

NEW METHOD OF PRODUCING MAGNETIC OXIDE ON IRON.—An invention of some importance in rendering the surface of cast or wrought iron proof against rust, has recently been perfected by Monsieur P. Henry Bertrand, Paris-Grenelle, says the *Ironmonger*. The process consists in depositing by one or other of the galvanoplastic methods now in vogue, a metal or metallic alloy, susceptible of volatilization at about 1000° C. After being coated with this metal, the articles are placed in a furnace and heated to 1000° C., or whatever temperature is necessary to secure the volatilization of the coating of metal. Notwithstanding the envelope, the iron particles become oxidized, but without permitting the oxygen to accumulate in insufficient quantity to form sesquioxide of iron. At the same time the oxygen is enabled to penetrate in such quantity as to form magnetic oxide, Fe³O₄. During the process, the metal or metallic alloy becomes volatilized, and after four or five minutes, the magnetic oxide completely covers the objects under treatment. The formation of the magnetic oxide can be produced by the operator at will, and no special skill appears necessary to work the process, but it is, of course, necessary to use the material supplied by the inventor, in the preparation of which a secret composition is probably employed. The oxidation is said to offer a perfect protection to iron surfaces against rust for any length of time.

RETAIN THE INDIAN NAMES.—There should be a revision of many of the names of rivers, mountains, valleys, etc., in California. The outlandish names which have found their way by means of the early comers into this State, into our maps and books and talk, should be laid aside and a new nomenclature adopted, better suited to our present and future civilization. There are many names now in use which are unfit to be spoken or printed. We could probably do no better than to adopt the old Indian names. Whatever may have been the lack of taste and civilization in the aborigines of this State, and the entire country in fact, in their modes of life, they were certainly far in advance of the present inhabitants in their taste for nomenclature. Many of the names they employed may be lacking in euphony to English ears, but they all had either a beautiful or most significant appropriateness of meaning to the localities to which they were applied. The State of Georgia, more than any other State of the Union has retained the Indian names of its rivers and most of them have a musical sound, as, for example, the Ocmulgee, the Obopees, the Ogechee, the Cannonchee, the Oconee, the Chattahoochee, the Altamaha and others. These examples might be multiplied indefinitely.

THE PRESERVATION OF BOOKS.—The paper on books which have survived for two or three centuries, is a very different article from the book paper of to-day. The paper upon which books were printed 300 years ago, was honestly made and durable. No strong chemicals were employed in its preparation. Neither wood, pulp nor clay entered into its composition. It was made by hand and of honest rags, mostly linen; cotton was little used in those days. It was made to last and it has lasted, and will continue to last until most of the book paper of the present day has crumbled to pieces by reason of its inherent decay, induced by the strong acids, the fibrous wood and dusty clay used in its manufacture. The most of the books of to-day, notwithstanding their strength and in every way, superior binding, will hardly hold together a century. Two hundred years hence a book printed during the present century will be something rare indeed. Both the printing and writing ink now used possess a far less enduring quality than that used 150 years ago.

WHY PLANTS GROW ERECT.—Why trees or other plants grow erect has never yet been definitely determined. It has been supposed to have some relation to the action of light. Certainly, a plant usually growing erect turns toward any opening for light in a dark cellar, but when there is no light, they grow erect. Dr. Maxwell S. Masters has recently called attention to some cases in an English coal mine 1000 feet deep. Some props made from green posts pushed out into growth, and though in absolute darkness they were perfectly erect. They were perfectly blanched.

CHEMICAL HEAT.—The North of France Railway Co. is about to experiment upon a method of warming its cars by chemical heat. The heat is to be derived from acetate of soda. That chemical will be placed in boxes in a solid state and then immersed in water at 100° F., thus liquefying the soda. The heat will be obtained by the process of the subsequent solidification of the chemical, which will gradually take place after the boxes have been taken from the water. This process can be repeated continuously, each immersion requiring from five to six hours' time to solidify.

ELECTRICITY.

Petaluma and Santa Rosa to be Connected by Electricity.—According to the *Petaluma Imprint* there is good reason to expect that Petaluma and Santa Rosa will soon be connected by an electric railway. One or two gentlemen from the East are working to this end with one or more citizens of Petaluma. Some doubtful Thomases who asked, "How can you possibly compete with steam?" was simply answered by their showing the proof of one eastern road, about 20 miles long, that had absolutely forced the steam railroad that it paralleled to discontinue its local trains. There are many reasons why this is possible on a road no longer than this will be. In the first place, the power plant to do all the business for both passengers and freight will not be larger than that now used for lighting the city. Eastern experience has proved electric roads of this length cheaper, faster, cleaner and much safer, as the engineer, or brakeman, stands in a glass turret, with a perfect view all around and has the most complete control of his car. The road will handle freight as well as passengers. It is contemplated that the road will, in the near future, be greatly extended from either end—to deep water at the southern end, from which boats will be put on to connect with San Francisco. The time between Petaluma and San Francisco will then be reduced to one hour and a half.

Electrical Postal System.—It is now very generally conceded that the full measure of success in our postal system cannot be attained until the electric telegraph and the long-distance telephone have been made part of our postal facilities, with the pneumatic-tube post as an adjunct. As to the public, the greatest benefit of the tube system is its cheapness. In this connection, we may remark that some of our South American neighbors are quite ahead of us in this important matter. It is announced that an electric railway, 186 miles long, is about to be opened in South America, connecting Buenos Ayres with Montevideo. This, however, is not a surface road, but an overland "telegraph line" and its object is to carry letter-boxes between the two cities. It crosses the mouth of the La Plata, where it is 19 miles wide, and two wires are supported by a tower on each side of the river, nearly 270 feet high.

Underground Wires.—The recent examination of an underground electric cable line which was laid in France in 1885 revealed the fact that 394 faults were discovered in the cable. These faults were investigated and proved some to be caused by lightning discharges, a hole being made in the insulation or the wire broken. In some places long lengths were found to be rotten, the insulation being completely eaten away, and the trough holding the cable being filled with a foul, blackish liquid. Those interested state as their opinion that the trouble is of mechanical origin, which in time developed into a chemical action, which caused the decay of the covering. The fact that the cement varied in quantity at different points leads some to believe that compulsion in the cement conduits is partly to blame.

Electricity in War and Commerce.—Electrical machinery is being rapidly introduced into war practice, both upon land and upon the sea. There is no doubt but that this new agent will come into large and varied use in the warfare of the future, and that it will form a most important factor in deciding future battles. The search light will present an important feature in preventing surprises. One of these light projectors, with one man on the lookout, would take the place of a ship's crew waiting in arms during the long dreary nights in the vicinity of the enemy. The use of electric lights in commerce is of equal or more importance, as has been shown in the navigation of the Suez Canal, and as will also be found in another inter-ocean highway which will soon be navigated at Nicaragua.

Rapid Progress in Electric Work.—One of the most forcible tributes to the genius of American electricians that we have heard of was paid by the head of one of the most prominent electric-lighting companies in the United States by refusing to fill an order for more of a certain staple article than would last two months. The reason he gave was, that in that period the whole system of incandescent lighting might be completely revolutionized.—*Electricity.*

Electricity in Brewing.—It is considered by a writer in the *Brewers' Journal* that the application of the electric light would tend to increase the amount of yeast formed during the concluding processes of fermentation in the brewery.

The California Electrical Society meets the first and third Monday evenings of each month, at the Academy of Sciences building. W. C. Quimby, Pres.; O. Brooks, Vice-Pres.; C. E. Purling, Sec'y; W. C. Crockett, Treas.

An Englishman has patented a compound to be placed on the outside of incandescent lamps. After the current is switched off, the compound remains luminous, so that the lamp can be seen in the dark.

Electricity is now used for heating flat-irons used by tailors.

ENGINEERING NOTES.

Life-Shortening Occupations.—The *Medical Age* contains the following abstract from the *Journal of the American Medical Association*: One of the onerous features of modern life is the extent to which the most hazardous trades are overrun by applicants for work. The electric light companies never find any difficulty in obtaining all the linemen they need, notwithstanding the fact that the dangers of that kind of business have been demonstrated times without number. The men who work in factories where wall paper is made, frequently make one another over the tradition that a man's life, in this trade, is shortened ten years. A similar belief is prevalent in factories where leather papers are made, and among men who have to handle them, and whose lungs are said to become impeded by inhaling the dust arising from such papers. In certain other factories, where brass ornaments and fittings are made, the air is laden with very fine brass particles, which are, when inhaled, especially irritating to the lungs. But one of the most singular advertised calls for employees that was ever printed, appeared recently in a Connecticut newspaper, signed by a firm engaged in the business of building towers. It called for applicants only among those who are young, strong, and courageous, and closed by saying: "We warn all seekers for this job that it is of the most dangerous nature, and that few men continue in it more than a few years. In fact, it is almost certain death to the workman who follows this occupation." The manufacture of white lead is one of the most deadly operations in which men can be actively engaged, when conducted in the usual manner. Quite recently, however, an entirely new mode of manufacturing this useful substance has been devised which is perfectly harmless to life and health.

A Remarkable Ferryboat.—One of the most extraordinary boats on the American lakes is a passenger car transfer ferryboat operated in the Straits of Mackinac by the Duluth, South Shore and Atlantic Railroad. It has an enormous capacity for carrying cars, but its peculiarities are its strength, its shape, and the number of its steam engines. It carries 24 steam engines for the performance of the various requirements of its dolly business. The hull of the boat is as solid as the walls of an old time block house. The bow rises from the water so as to hang or slant over it, as if it were a hammer, and that is what it was built to be. The boat is an ice-breaker, intended to keep a channel open in the straits during the winter, or to make one whenever it is pushed into the massive ice that forms in that cold region. The big boat advances toward the ice, and shoving her nose upon its edge, lifts herself upon it. Then a screw propeller under the overhanging bow performs its work of sucking the water from under the ice to enable the boat's weight to crush it down the more easily. Thus the destructive monster makes her way steadily through the worst ice of the semipolar winters of that region, climbing up on the ice, crushing it down, scattering it on each side and making no more of it than if it were so much slush.—*Iron Age.*

The Great Dam Across the Colorado River.—The great dam across the Colorado river at Austin, Texas, is now making substantial progress. This dam will be, when completed, 1150 feet long, 60 feet high and 18 feet wide at the top. The upstream face is of limestone and is vertical; the downstream face is of granite, and the interior is rubble masonry of small stone and cement. The dam is intended to utilize the power of the Colorado river. The water power will run the electric light plant, furnish power for the electric railroads and for pumping the water supply of the city, and leave a surplus of some 13,000 horse power for the use of factories. It is about two miles above the city of Austin and the natural conditions are very favorable, as the river there runs between high bluffs and the bed is of rock, so that very little excavation is required to find a solid foundation. It will be the largest power dam yet built in this country. The estimated cost of the dam is about half a million dollars.

Curious Foundations.—The *Railway Review* tells of a novel method of laying foundations in swampy soil recently employed by an American engineer. The building to be supported was a low wooden one which it was proposed to use for the storage of machinery. Casks were set in holes in the ground along the line of posts, and were filled to the depth of about one foot with iron turnings. The posts were placed in the casks, which were then filled with iron turnings compactly rammed in place. A solution of salt and water was slowly poured over the turnings, under the action of which they solidified into a hard mass. The heat of the oxidation of the iron was so great that the posts were charred. This also served to act as a preservative, and to that extent, the iron turnings are probably superior to concrete under similar conditions.

Beating the Whaleback.—It is said that a marine engineer of Toronto has constructed a model and drawn plans of a new style of craft which, it is said, will revolutionize the lake carrying trade. It is said to be as far ahead of the patent whaleback vessel as the whaleback is in advance of the old model lake craft of

square build. Redway's boat is fashioned after the model of an Indian canoe. It has a flat bottom, except for a fraction of the keel at the stern to accommodate the rudder. The hull is somewhat after the style of the whaleback. There are no bulwarks. The upper works are meager, being only a cabin at the stern, where the holler and machinery are, and a small protection forward, so that the anchors and cable chains can be approached in any kind of weather.

Utilizing the Tides.—The utilization of the power produced by the ebb and flow of the tides has been made in Havre to work turbine wheels, which generate the power necessary to run the dynamos which furnish Paris with the electric light.

Connecting Paris with the Ocean.—A report of the committee appointed to examine into the merits of a canal from Paris to the sea has just been made public. The canal will be 114 miles long and 21 feet deep, and will cost \$35,000,000.

Wave Power.—Waves exert a force of one ton per square inch when they are only 20 feet high. At Cassis, France, granite blocks of 15 cubic meters have been moved by wave force.

The Deepest Sounding yet made on the coast of Africa was of New Orleans, by H. M. S. Challenger, whose 400-pound lead struck bottom at the enormous depth of 26,700 feet.

A New Style of Bicycle is urged along by an auxiliary power imparted from the handle bar. It is used in sporting and hill climbing.

There are 208,749 railroad bridges in the United States, spanning 3213 miles.

GOOD HEALTH.

Heart Disease.

"Yes," said an eminent physician, "heart disease is common; it is, perhaps, much more frequent than is generally realized, if you take into consideration all the forms of heart disease. The heart, like other organs, is the seat of a large number of diseases, and the expression, 'heart disease' is as indefinite as the term 'skin disease'; it may have a score of different meanings. I am inclined to believe that heart diseases are more common than they formerly were," he continued. "This is due to the great nervous and physical strains which attend our modern modes of living. But it is a great wonder that the heart is not more frequently the seat of disease than it is when we consider its delicate mechanism, its ceaseless labor, and I might add, the abuse to which it is subjected. The heart is one of the most exquisitely constructed machines that can be conceived of. With its four chambers, its four sets of valves, and supplying its own motive power, it toils constantly, faithfully, for its three-score years and ten without rest, without repair, responding to every demand, however unreasonable, until, finally exhausted by labor or degenerated by disease, it is no longer capable of carrying on its function. It falters, then, resumes its work, falters again as if to warn its host that he must be less exacting; again resumes and again falters, until, sooner or later, the last point of endurance is reached and it ceases to beat.

A Tired Heart.

"Did you ever hear of a 'tired heart'?" No one ever thinks that the heart may become fatigued. But it is true, and frequently the fact. The heart is just as liable to suffer from fatigue as is any other muscle in the body. I have never seen it mentioned in the books, but the condition may be recognized almost as positively as any other abnormal state of the organ. A positive diagnosis cannot be made at once in most cases, because of the resemblance of the physical conditions to those present in dilation of the heart. But under rest and proper treatment the heart returns to its normal condition in a comparatively short time, which is almost an impossibility in the case of a dilated heart. Not a few cases of so-called nervous 'prestration' are nothing more than fatigue of the heart.

"Life would be prolonged by a little more attention to the heart; by paying a little respect to the most faithful servant we ever have. A good deal of good might be done, also, if parents would teach their children the danger of overtaxing the heart. They should teach them to stop and rest a few moments during their play when they are able to feel the violent throbbing of their hearts against the chest-wall."

Pedestrians, either amateur or professional, who suffer from sore feet after an unusually long walk, will experience great relief from soaking the feet once or twice a week in a half pailful of hot water, to which a piece of nitrate of potassium the size of a small walnut has been added.

Increasing Use of Patent Medicines.—Thirty years ago the revenue from patent medicines in Great Britain was \$210,000. It now amounts to many millions annually.

A Pasteur Institute was opened June 1st at Saigon, Cochinchina, under the auspices of the French government. The work of the institute will extend over the whole field of microbiology.

USEFUL INFORMATION.

Why Lobsters and Crabs Turn Red.

"What makes lobsters and crabs turn red when they are boiled?" said the observant fish man, in reply to a question. "Well, strictly speaking, they don't. The lobster or the crab is just as red before it is put in hot water as it is afterward, only it is subdued by a mingling of blue in its make up that gives it a grayish appearance. The blue and red of a live lobster or crab are pigments in the shell. As long as they are there together, the red becomes gray. But both of these pigments are not fast colors. The blue won't wash, but the red is there to stay. If it were possible to keep lobsters or crabs alive for any length of time in the sun, the blue would fade out as quickly as the same color does out of a cheap flannel suit, and the shells would be a vivid red, as if they had been hotted. It is not an uncommon thing to catch live lobsters and crabs, more frequently the latter, that are entirely red. It has been determined, however, that this eradication of the blue pigment is the result of disease. Live red crabs and lobsters are never put on the market. So the reason a crab or a lobster turns red, as the saying is, when it is hotted, is because the hot water instantly washes the fugitive blue coloring matter out of the shell and leaves only the fast red. It does not take long holling to change the color. If you were to rescue a lobster from its hot bath two seconds after it is submerged, you would find it as red as if it had been boiled for an hour."—*N. Y. Sun.*

Plowing by Night.—A plan has been adopted by the farmers of Colusa county to gain time by plowing at night, as a means of accelerating fall plowing. The plan is to use a steam plow which can be run day and night over the level farms at the rate of eight miles an hour. It has a traction engine, and tears up the ground in strips 21 feet wide, doing its work much more evenly and thoroughly than the old horse plows. The same appliances are used for combined harvesters and thrashers in the proper season. The engine is equipped with locomotive headlights for night work, and they throw a light in the path in front of the machine. Additional lights throw their rays on the plow, which are placed in a row obliquely from the direction of progress, enabling the machine to turn sharp corners. Ordinarily, an engineer, a fireman and a man to look after the plow can operate this labor-saving device, which plows about 160 acres a day, running continuously, at a cost of 12½ cents per acre, including wear and tear of machinery. Team-plowing could not be carried on for less than 75 cents an acre. The ability to work at night enables a farmer to rush his work when he is pressed for time. The main objection to running at night is the difficulty encountered in having two different crews to run the machine, one by day and the other by night. If anything goes wrong during the day, the night engineer usually falls heir to the difficulty, which the other frequently neglects and makes no effort to repair the damage.

Where Quick Eyes and a Clear Head is Needed.—When a railroad company, says the *Philadelphia Record*, handles as many million tons of coal annually as the Reading does, the question of weighing it becomes a matter of some importance. Skill and long experience have solved the problem, however, and the bulk of the vast coal tonnage of the leading coal-carrying road in the country is weighed on four scales, and then they are not crowded. The weight of the empty car is marked in chalk on the outside. As the car approaches, a clerk takes the number of the car and its weight, the weigher calls out the gross weight, and the difference is the weight of the coal. The cars run as fast as ten miles an hour across the scale, and it is very seldom that one has to be stopped and brought back for reweighing, although that is done when the weigher is at all uncertain about his figures. The men at the scales can generally tell within a hundred pounds or so what a car contains. As soon as they see the class of car coming, they know the number of tons it contains, and have the scale so prepared that only the hundred weights need be adjusted while the car is moving over it. Expert officials of the company can tell at a glance what each class of cars should contain, and if, in looking over the weight sheet, any car appears either too heavy or too light, it is brought back and reweighed.

Exporting Apples to Europe is becoming one of the most important features of the trade. Up to the first week in November, 555,000 barrels had been shipped from New York since the season began. Last year, 195,164 barrels were sent abroad.

Don't Mend Your Gloves with Silk.—It is a very great mistake to mend gloves with silk, as the silk will out the kid much sooner than cotton of equal fineness. All kid gloves are sewed at the manufactory with cotton thread.

Grain Harvesting has been reduced to a fine point in California. A recent report from Stanislaus county shows that it costs just 80 cents per acre to harvest the crop from a ranch of 7330 acres.



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SAN FRANCISCO:

Saturday, January 2, 1892.

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See Advertising Columns.

Passing Events.

Our readers should not forget that this number is the first of a new volume of the MINING AND SCIENTIFIC PRESS, and that this is a good time for the renewal of subscriptions.

The storm of this week was very general and brought rain and snow over most parts of the State. People were beginning to fear a "dry year," so that the abundant rain was doubly welcome, dissipating, as it did, all fears of the kind.

The decision of the Supreme Court this week on the subject of making public the balance-sheets and statements of mining companies, is a very good thing indeed. Many of the companies are managed in the interest of directors rather than stockholders. Any one, even the smallest stockholder, should be able to know of the affairs of the company, and under this decision he can.

The outlook is for a very favorable year for California as to most products. If, now, a plan can be carried out to let the hydraulic mines again be worked, always provided no other interest is injured in any way, a long-dormant industry will be rehabilitated. The matter will be thoroughly discussed at the coming Mining Convention in this city.

Mining Companies' Balance Sheets.

In the case of Francis vs. Samps, the Supreme Court of this State, in rendering an opinion affirming the judgment and order of the lower court in favor of the plaintiff has virtually decided in favor of the legality of the mining laws of this State under which mining companies are incorporated.

This action was to recover \$1000 from the defendant, a director of the Yosemite Queen Gold, Silver and Lead Mining Company, a corporation, for omitting to cause to be posted an itemized account or balance sheet on the first Monday of November and December, 1886, and the first Monday in January, 1887, as required by legislative act. The court says: "If the law imposed the duties specified in the act upon the directors of corporations actually carrying on or conducting the business of mining the contention of the appellant's counsel would be unanswerable, but the law imposes such specified duties upon the directors of corporations formed for the purpose of carrying on or conducting the business of mining. The itemized accounts or balance sheets probably would have shown very little, but that little might in some cases be of interest to stockholders. The law under which this case is prosecuted does care for small things. It does not exempt them, and we do not feel authorized to do so."

This decision upholds the correctness of the contention of the MINING AND SCIENTIFIC PRESS for not only a strict observance of the letter of the law imposing specified duties upon the directors and other officers of mining companies, but also that all else should be done calculated to better protection of shareholders.

In this connection, it is not out of place to reproduce the following essential features of the law which are ignored by many of the companies:

* * * It shall also be the duty of the superintendent to file with the secretary a weekly statement, under oath, showing the number of men employed under him and for what purpose, and the rate of wages paid to each. He shall attach to such account a full report, under oath, of the work done in said mines, the amount of ore extracted, from what part of the mine taken, the amount sent to the mill for reduction, its assay value, the amount of bullion received, the amount of bullion shipped to the office of the company or elsewhere, and the amount, if any, retained by the superintendent. It shall also be his duty to forward to the office of the company a full report, under oath, of all discoveries of ore or mineral-bearing quartz made in said mine, whether by boring, drifting, sinking or otherwise, together with the assay value thereof. All accounts, reports and correspondence from the superintendent shall be kept in some conspicuous place in the office of said company, and be open to the inspection of all stockholders.

The law in not specifying pulp or battery assays of the ore milled, but in specifically saying the assay value of all ore taken out, is accepted by mining men not controlled by rings as undoubtedly meaning the mine or car-sample assays. This construction is made more plainly evident when it requires the assay value of all ores discovered. There can be no doubt but the above was enacted into law to protect mining shareholders against mine looting, for as J. W. Mackay virtually testified in the Hale & Norcross suit, it is only by mine or car-sample assays that checks can be placed against the rapacity or misappropriation of bullion by mill-owners.

The Engine Runner's Catechism.

We have received a copy of a new book by Robert Grimshaw, called the "Engine Runner's Catechism," a work evidently of a very practical character, arranged in convenient form and containing a large amount of valuable information essential in every-day operations. It treats more of special builds of engines, as erected, adjusted and run, than of the properties of steam or the general principles of engine design and construction. It gives descriptions of various well known makes of engines, with details of shipping, making foundations, erecting and starting; the adjustment of special makes, each of which has its own peculiarities of construction, often puzzling to engineers of experience. This last feature should prove

specially valuable to young engineers or to those in isolated plants where opportunities for communicating with other engineers or with the builders of an engine are few. The author has made his instructions plain, complete, accurate and up to date. The price of the volume is \$2. It is published by John Wiley & Son and sold in this city by Osborn & Alexander, 401 Market St., who will send it free of transportation for the price mentioned to any point on this coast.

Stockbrokers Organized for Reform.

Over three years ago the MINING AND SCIENTIFIC PRESS began to show up the mismanagement of the Comstock mines, and calling on the directors of the various companies to have the mines worked and the ore milled according to the laws of California under which the companies were incorporated. One of the results of this agitation was the calling into life of the Mining Stock Association, which since its organization has been actively engaged in securing evidence with which to bring suit against the directors of several of the mines. That they met with strong opposition from the stock pools and mill rings only feebly expresses the fierce fight waged, but after many months of hard work, the Association was in possession of enough evidence that funds had been misappropriated to justify their bringing suit through M. W. Fox, an active member of the Association, against the Hale and Norcross directors. The developments in the suit have been a constant source of wonder to the public, how such open, barefaced, mismanagement was possible and the directors not be brought to justice long before this.

The awakening to a realization of the way in which mines are looted is not confined to the public alone, for we find that several of the leading brokers of the San Francisco Stock and Exchange Board have become thoroughly convinced of the rotten condition of affairs and have banded together and propose to bring about the long-desired reform in mine management. This movement, while confined in its membership, embraces those in whom the public can place confidence. They have organized an Executive Committee and will continue their fight at first in trying to secure control or else force the managers to buy stock to keep control of the following mines: Overman, Balcher, Crown Point, Sierra Nevada, Hale and Norcross, and Savage. In forcing the managers to buy enough stock to control the elections, they act on the well-known principle that the former will not, when having control, levy assessments, but work the mines so as to pay dividends. The brokers rightly claim that there are many mines in the Comstock district that can and should be paying dividends were it not for the looting as carried on by inside rings.

So far, the committee's efforts have met with much better results than thought possible in so short a time. This success goes far in proving that there is an earnest desire to down the stock pools and mill rings in the interest of outside shareholders, so that dividends and not assessments shall follow. The brokers fully realize that it is no child's play to not only force the various rings to the wall, and after their efforts are crowned with success to keep a vigilant eye on the workings of the miners, so that it will be an impossibility for other rings to be organized for looting. Much now remains with outside shareholders in carrying to full fruition the program as outlined by the committee, and to get the former to work in harmony with the brokers. The latter have appointed the stockbroker firms of A. G. Garnett & Co., this city, with whom shareholders can consult, either in person or by letter, regarding the move.

The Miners' Convention.

The State Mining Convention occurs in this city on January 20th. Word has been received from about 25 counties which will be represented. It will be the first time in the history of California that the practical mining men of the State have met to discuss their interests. About all of the other important industries have been represented in conventions or associations, but mining comes to the front now for the first time.

That the meeting will be productive of good there can be no doubt whatever. The public is

not generally well informed as to the condition of the mining industry in California, and, in fact, it has been neglected for some years.

The result is the miners have several complaints to make concerning the laws which govern their business. These have been stated in our columns and need not now be referred to. When the Convention meets they will be fully set forth.

It is our opinion that the coming Convention will be composed of an earnest body of men, who will, however, be conservative in their demands. They will plainly set forth those facts favorable to their industry and show, as far as may be, the way by which it may be relieved of many burdens. The people of the State should pay heed to the proceedings and aid in every possible way the miner in his efforts to improve this great industry.

Miners' Resolutions.

There are in this State some men who, because they can see no way by which hydraulic mining can be carried on without injury to the rivers and farming lands, think there can be no way. These same persons "view with alarm" the present efforts of the miners to rehabilitate the hydraulic mining industry.

It is not necessary at this time to discuss the merits of this controversy, which has been going on so many years. There is one point, however, to which attention should be directed, and it is this: In every case where the miners in the different counties have held meetings, and where resolutions have been adopted, said resolutions expressly stipulate that it is the wish of the miners only to resume mining in such a way as to injure no one.

Now, if the miners themselves do not ask to be permitted to resume mining on the old plan of letting the debris take care of itself, and doing what damage it might, no one else is going to ask it. They perfectly realize that they could never again do as they did before; that the debris must be kept out of the rivers and off other people's land; that restraining works of some kind must be constructed; that there must be some official supervision over their work; and that, if they are to run these mines at all, they must be run on a plan which will do no injury of any kind to other interests.

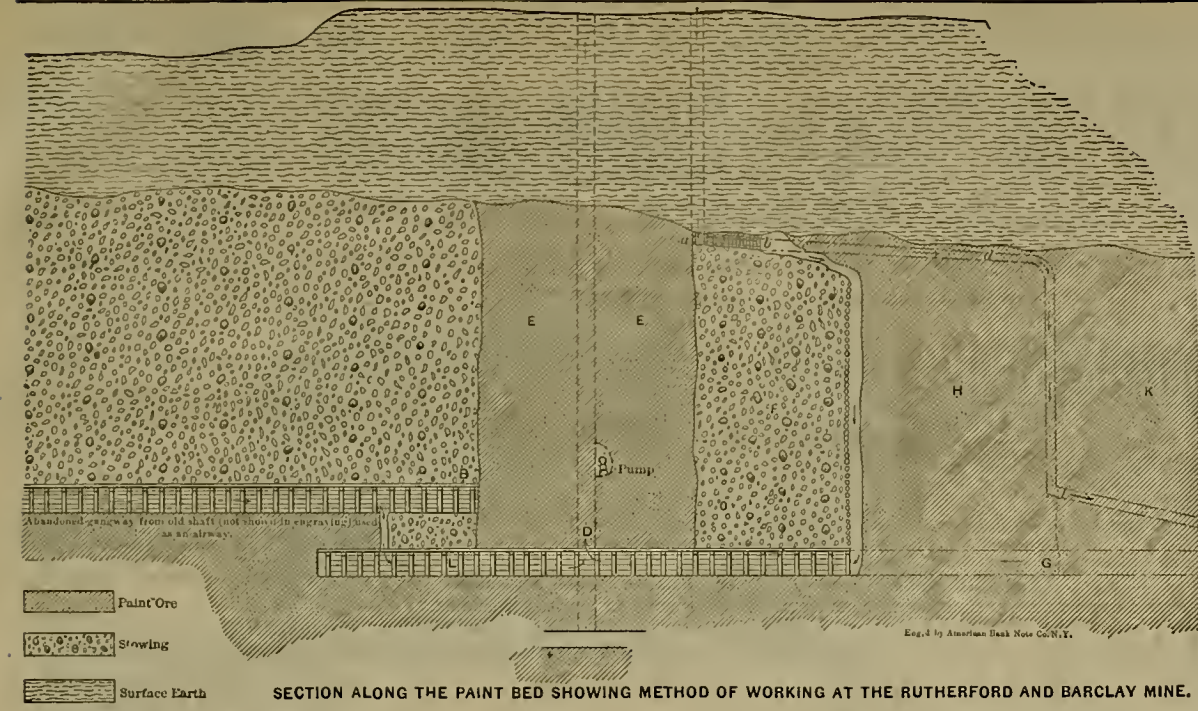
There is, therefore, no cause for alarm among those who are afraid of debris. There can and will be no more of that. If the dams recommended by the engineers are built, and found not to accomplish the purpose satisfactorily, then that is the end of hydraulic mining for good and all.

There is this, however, the miners do not wish those opposed to mining to be any longer the judges of what can or should be done. They want unbiased and unprejudiced professional judgment. They want the Government, after having appointed its own engineer to report on the subject, to take up that report and act on it in some way. They want some sort of adjustment of the matter, by which they can work their mines. But, as stated, they do not ask or expect to do this, when by so doing they will injure other interests. This point should be kept clearly in mind by the unprejudiced public, as well as by those who object to the present movement of the miners of this State.

Working a Paint-Ore Mine.

To increase the durability of paint exposed to the weather, it is necessary to protect the oil with a substance that is itself unaffected by the elements. The so-called "metallo" paints, containing ochre, possess this property, as the small particles of ochre are unaffected and penetrate the pores of the wood or iron, covering the oil and preventing it from evaporating. There are several deposits of this kind in California, more or less worked, but none on a very large scale. At Lehigh Gap, Pa. is a very extensive deposit, which has been worked many years, and it will interest many California miners to read an abstract of the description written for the American Institute of Mining Engineers by C. E. Hesse of Mount Carmel, Pa.

Mr. Robert Prinos discovered this mine in 1856, while prospecting for roofing slate. The low melting point rendered the ore worthless for metallurgical purposes, but the properties of some of the calcined material indicated its value for making metallic paint. Mr. Prinos worked the deposit and his success led other firms into the business. Mr. A. R. Bass succeeded Mr. Prinos after the latter's death, and manufactured "Prinos's Metallic Paint." The principal firms now engaged are the Prinos Brothers and Rutherford & Barolay, who con-



trol the paint supply of this region.

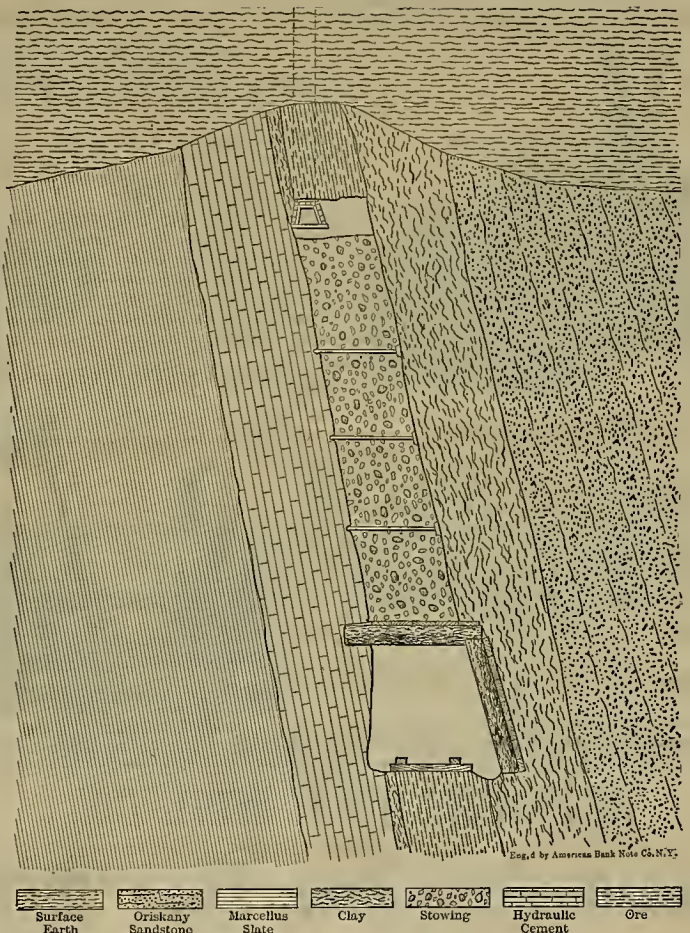
Along the outcrop of the paint, the beds are covered by a cap, or overburden, of clay, and by the decomposed lower portion of the Marcellus slate, which is 50 feet thick at the Rutherford shaft. This slate is very hard and is quarried at a few places, notably near Millport.

The paint bed is not continuous throughout its extent. It is faulted at several places; sometimes it is pinched out to a few inches, and again increases in width to six feet. The ore is bluish-gray, resembling limestone, and is very hard and compact. The bed is of a lighter tint, however, in the upper than in the lower part, and this is probably due to its containing more hydraulic cement in the upper strata. The paint ore contains partings of clay and slate at various places. At the Rutherford shaft, there are fine bands of ore, alternating with clay and slate, as follows: Sandstone (hanging wall), clay, ore, slate, ore, clay, ore, clay, ore, slate, ore, cement, slate (footwall).

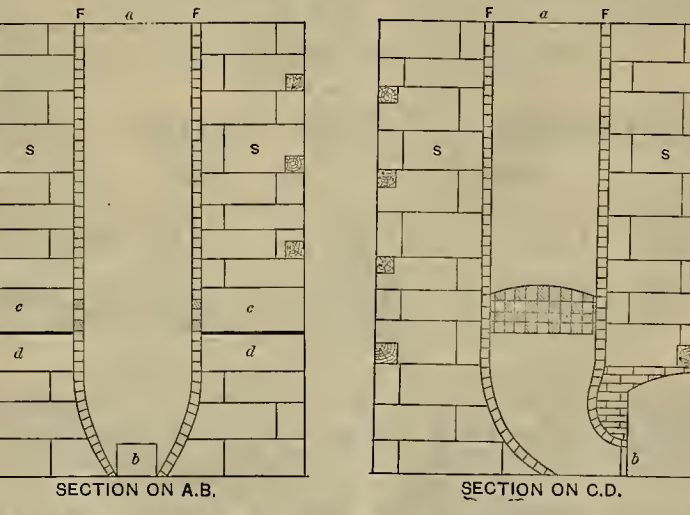
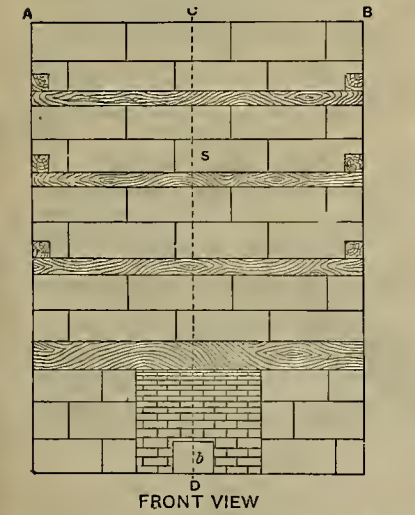
The method used in mining is a variation of panel work. Nearly the same system of working is employed by all of the companies who have developed their mines either by means of tunnels or shafts. Tunnels are preferred whenever equally convenient, because they involve no expense for pumping and hoisting machinery, fuel, repairs to machinery, etc.

The following description of the operation of the Rutherford mines is typical of all the workings in the vicinity:

The Rutherford tunnel is six feet high and 600 feet long. The gangways are driven along the footwall on the cement side, six feet high, and are heavily timbered and lagged at the top and on the clay side. The sets of timbers are 3½ feet apart, and usually of nine-inch timber. The width at the top is 3½ feet, with a spread of five feet at the bottom, the extra width being out from the clay. Where the cement rock is firm, the collar is bitched six inches into it, and supported by a leg on the clay side. The cost of the timber is 54 cents per set, including the lagging. The monkey gangway, which carries the air along the top of the breast from the air-shaft, is 2½ feet high, 1½ feet wide at the top, with a spread of 2½ feet at the bottom. Wooden rails with a gauge of 18 inches are spiked to the cross-ties. The cuts represent a section along the bed, and a section



SECTION ACROSS THE BED, RUTHERFORD AND BARCLAY MINE.



KILN USED BY RUTHERFORD AND BARCLAY.
S. Sandstone Casing. F. Firebrick Lining. a. Charging Hole. b. Door by which charge is drawn.
c. Fire place. d. Ash pit.

tion taken across the bed, show the method of timbering the gangways. The old shaft now used as an air-shaft, and the connecting gangway to B (middle out) were driven some years ago; the ore above this gangway was taken out, and the mine was abandoned. The shaft D was afterward sunk, and the gangway connecting with it was driven.

The gangway is not driven continuously, but after being driven about 55 feet on either side of the shaft, the breasts are started 25 feet from the shaft, a pillar E being left to protect it. The breast is then opened up to the face of the gangway, and when one ore-breast F is worked out, the gangway is driven ahead about 30 feet to G, and a new breast H is opened and worked out before commencing a third. The air-hole is first driven to the surface, then the breast is opened to its full width of 6 feet. The thickness of the bed of ore here varies from 4 to 6 feet, depending upon the thickness of the partings of clay and slate. The clay and slate are left on the bottom, which is left sloping to allow the ore to roll down to the chute, which is 6 feet wide and 4 feet long and heavily timbered. Small props or sprags are hitched into the cement and wedged with a lid on the clay side to prevent falls of rock.

The holes are drilled by hand in the clay partings. They vary in depth from 1 to 4 feet, and the charge of dynamite is varied correspondingly, according to the amount of ore it is desired to throw down. The loose ore is wedged down with crowbars and picks, and is then freed from any adhering clay and thrown down the chute. It is then loaded into boxes holding about half a ton each, which are pushed to the shaft on a truck. The ore boxes have four rings at the corners, to which are attached four chains, suspended from the wire hoisting rope. At the top of the shaft the boxes are detached and placed on a truck, which is run to the dump. Thirty cars, averaging 15 tons, are extracted in a day of two shifts, the day shift working nine hours and the night shift eleven. The pay of the miners is \$1.25 per shift. The cost of mining the ore averages \$1.75 per ton.

Natural ventilation is relied upon. The air hole is timbered and has an area of 2 by 2½ feet. In every case the monkey gangway, a, b, c, (upper cut) is carried along the face from air shaft. The manner in which the third breast, E, would be ventilated, is shown by means of the lines a, b, c, d, e, f, g. The stowing is packed so closely that there is little leakage after the roof settles. The air shaft is the in-take, and, after passing through the breasts and gangway, the air goes, as shown by the arrows, to the hoisting shaft, where it is warmed by the steam pipes, and a strong upward current is caused. The east gangway, L, is ventilated by the old gangway leading from B to an abandoned shaft.

The ore as it comes from the mines, is free from refuse, great care having been taken to separate slate and clay from it. In the working places, it is hauled in two-ton wagons to kilns, which are situated on a hillside, for convenience in charging. The platform upon which the ore is dumped is built from the top of the kiln to the side of the hill. The ore is first spalled to fist size and freed from slate, and is then carried in huggles to the charging hole of the kiln.

The slate, when burned, has a light yellowish color, which would change the color of the product. The lower out is a front elevation of the kiln and two sections at right angles to each other. The kiln is 22 feet high and 16 feet square on the outside. The interior is cylindrical, 5 feet in diameter, with a firebrick lining of the best quality. The interior lining slopes from the fireplace to the door by which the charges are withdrawn; this facilitates the removal of the calcined ore. The casing is of sandstone, 5½ feet thick, and tied together with the best white oak timber. When charged, a kiln holds 16 tons of ore, and the kiln is kept constantly full. The heat passes from the fireplaces—of which there are two placed diametrically opposite each other—through a checker-work of brick into the center of the charge; The charge is withdrawn by a door in the front wall two feet long and 18 inches high. The fire is kept at a cherry-red heat, and about one cord of wood is burned every 24 hours. The kiln works continuously, calcined ore being withdrawn and fresh charges made without interruption. The ore is subjected for 48 hours to the heat, which expels the moisture, sulphur and carbon dioxide. About 1½ tons of calcined ore are withdrawn every three hours during the day. The outside of the lumps of calcined ore has a light-brown color, while the interior shows upon fracture a darker brown. Great care is necessary to regulate the heat so that the ore is not overburnt. When this happens, the product has a black scoriaceous appearance and is unfit for the manufacture of metallic paint, and is extremely hard to grind.

The calcined ore is carried from the kiln in wagons to the mill, where it is broken to the size of grains of corn in a rotating crusher manufactured by W. F. Mosser, Allentown, Pa. The broken ore is carried by elevators to the stock-piles at the top of the building, and thence by chutes to the hoppers of the mills, which grind it to the necessary degree of fineness. Elevators again carry it to the packing-machine by a spout and it is packed into barrels. The total cost of preparing the ore, including mining, transportation, burning and grinding, averages \$5.75 per ton. The total waste is between 600 and 700 pounds in a long ton.

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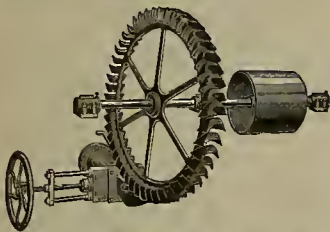
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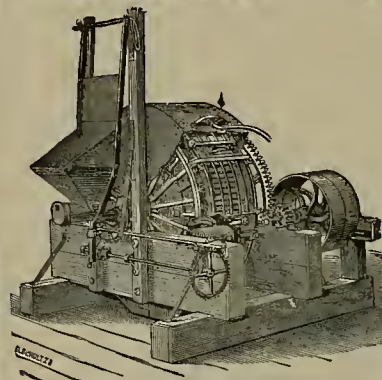
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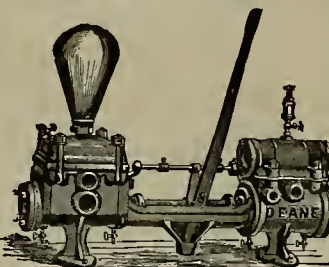
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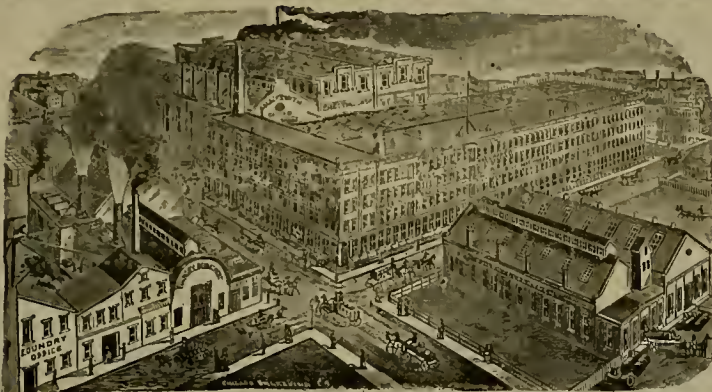
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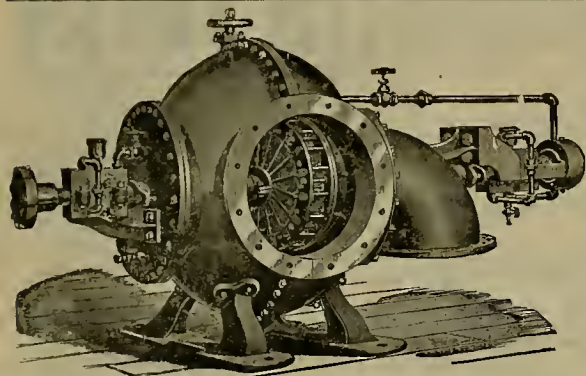
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Dec. 31, 1891.

The year closes with business on a sounder basis than for years past. High prices for cereals and feedstuff, and fair remunerative prices for the large crops gathered from the orchards, have contributed to this desired result. There is not an industry but feels the revivifying effects of the improved markets for farm products. The large crops, and a promise of still larger crops in 1892, are stimulating railroad and other improvement building. This naturally gives iron workers more orders, which, with cheaper raw material, ought to bring about better times for them. The local money market is easy, with further ease looked for on and after the middle of January. The disbursements in January will be the largest in the financial history of the State. In this (December) month the dividend disbursements by local corporations aggregate \$582,250, against \$424,620 for the like month in 1890. The mining companies' dividends, and not one paid by a Comstock mining company, aggregated \$313,000, against \$156,200 in December, 1890.

Eastern mail advices are of a very flattering character, and unless all signs fail, they point with unerring certainty to a large speculative craze in 1892, particularly in railroad securities. At the close of 1890 there was general depression, stringent money, scant railroad earnings, large gold shipments, derangement caused by a new tariff, and other causes of discontent, but now the New York banks are able to report a surplus reserve exceeding \$19,000,000, a condition of strength rarely equaled; excellent crops burden the railroads beyond their ability to transport, and earnings are correspondingly increased; wheat is going out of the country at the rate of 5,000,000 or 6,000,000 bushels a week, and early in the new year an enormous corn crop will be coming forward, much of it available for export. Besides, there is no end of cotton. For the week ending with Dec. 19th, the eastbound shipments from Chicago aggregated 120,000 tons, against 80,000 tons for the corresponding week in 1890. The enormous volume of the grain movement is further indicated by the fact that at last advices no less than 125 miles of track at Chicago were filled with loaded cars, and that the Burlington road alone had 2200 cars waiting to discharge. The effects are already seen in the receipts of gold from Europe, amounting to \$28,000,000 since the return movement commenced, early in September. A confident belief prevails that imports will soon be resumed in considerable volume.

MEXICAN DOLLARS—The market does not show any particular change. Quotations are still given at around 75 cents.

QUICKSILVER—Receipts the past week aggregated 333 flasks. The combination quote \$47. It is said that slightly lower quotations can be obtained from an outside party.

SILVER—The market has shown an unusual degree of steadiness. The markets at home and abroad partake of a waiting character; both producers and dealers seem to be waiting the action of Congress. It is quite generally believed that a free coinage bill will be passed at an early day by Congress, but which will be vetoed by President Harrison, provided the bill is not confined to the output of the mines of this country. It may be that both political parties will enact into law a more favorable bill, so as to take the question out of the coming presidential election. If this proves to be the case, then we may have passed and approved a bill covering everything required by bimetalists.

BORAX—The market is quiet but steady. Eastern advices report slightly lower prices.

LIME—Receipts the past week aggregated 6462 bbls. The market is steady at current quotations.

LEAD—There is nothing new to report in our market. Eastern mail advices report more activity with the market slightly firmer.

TIN—The market is very dull, with quotations altogether nominal. Eastern mail advices report the market dull but fairly steady. London cables to the Iron Age, Dec. 24, report "pig fairly firm with quiet buying. Plate is quiet, but high-grade Ternes met with very fair demand, and several makers are now booked three months ahead on that class of product. Bessemer coals of odd sizes were the most active, however, and a number of forward contracts were secured at 125 6d at Wales, against 125 2d for ordinary 14x20."

IRON—For parcels on spot, on passage and for shipment the market is reported strong, with some holders asking an advance for special consignments. English cables report a slight advance for Scotch warrants. New York advices report a firm market.

COPPER—The market is quiet but steady. Iron Age reports the New York market as follows: There is some evidence of a turn for the better in the temper of the market. The improvement has the support of a very fair amount of new business and numerous inquiries from consumers for 30 to 60 days' supply at prices at which there seemed to be very little chance of doing any business a week ago. A few purchases at 10 1/2c to 10 3/4c appear to have cleaned up the cheap lots of Lake Superior ingot, temporarily at least. Bids of 10 1/2c are now freely made, in some instances for good-sized lots. At 10 1/2c a number of sales have been made, which price seems to be the lowest that any of the mining companies will now accept for either prompt or future deliveries.

COAL—Imports the past week aggregated as follows: Nantamio 1500 tons, Coos Bay 750; total 2,250 tons. This is the smallest import in any one week we have any recollection of reporting. It is doubtless largely due to heavy storms at sea. The local market continues oversupplied. The consumption is quite large and steadily increasing for household purposes.

AN IMMENSE SHEAR—In a steel mill at Newburn, England, is a machine that will shear an ingot of steel 30 inches in width and 12 inches in thickness. A mighty foot holds the ingot in place, and the knife descends and snips off a piece as a boy onto a dandy. Hydraulic power is used, and the cut can be made in about three seconds.

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COMPANY AND LOCATION.		No. AMT.		LEVIED DELINQ'T AND SALE.		SECRETARY.	
Butte Que Pasa Co., California	1	20	Nov 27, Jan 5, Jan 25	Nov 27, Jan 5, Jan 25	V. T. Gadsden, 119 Bush		
Confidence Silver M Co., Nevada	1	75c	Nov 17, Dec 23, Jan 11	Nov 17, Dec 23, Jan 11	A. S. Groth, 414 California		
Crocker M Co., Arizona	11	10c	Dec 15, Jan 19, Feb 11	Dec 15, Jan 19, Feb 11	Nat T. Messer, 309 Montgomery		
Crown Point M Co., Nevada	56	50c	Dec 2, Jan 6, Jan 27	Dec 2, Jan 6, Jan 27	J. Newlands, 331 Pine		
Grass Valley Queen M Co., California	1	50c	Dec 8, Jan 14, Jan 30	Dec 8, Jan 14, Jan 30	J. P. Holling, 110 Phelps Building		
Hale & Norcross S M Co., California	3	50c	Nov 12, Dec 18, Jan 11	Nov 12, Dec 18, Jan 11	A. B. Thompson, 309 Montgomery		
Morgan M Co., California	15	10c	Nov 20, Dec 23, Jan 10	Nov 20, Dec 23, Jan 10	L. C. Breese, 230 Montgomery		
Potosi M Co., Nevada	27	10c	Dec 10, Jan 15, Feb 4	Dec 10, Jan 15, Feb 4	C. E. Holt, 309 Montgomery		
Scorpion S M Co., Nevada	29	10c	Nov 12, Dec 15, Jan 5	Nov 12, Dec 15, Jan 5	G. O. R. Spencey, 309 Pine		
Slackton Con Quicksilver M Co., California	2	20c	Dec 2, Jan 28, Feb 19	Dec 2, Jan 28, Feb 19	D. O. Bates, 309 Montgomery		
Teresa M Co., Mexico	6	10c	Jan 1, Jan 4, Jan 23	Jan 1, Jan 4, Jan 23	A. Cheminant, 328 Montgomery		
Justice M Co., Nevada	49	25c	Dec 23, Jan 25, Feb 17	Dec 23, Jan 25, Feb 17	B. F. Kelly, 419 California		
Umpire G & S M Co., Oregon	11	15c	Dec 16, Jan 25, Feb 15	Dec 16, Jan 25, Feb 15	A. Cheminant, 328 Montgomery		

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	MEETING.	SECRETARY.	DATE.
Brundish Con Gold M Co., Nevada	Annual.	J. Stadfield, Jr., Nevada Block.	Jan 14
Silver King M Co., Arizona	Annual.	J. W. Pew, 310 Pine.	Jan 12

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Champion M Co.	10	T. Wetzel, 320 Sansome.	Aug 15
Cons Cal & Virginia M Co., Nevada	50	A. W. Havens, 309 Montgomery.	Aug 17
Copits M Co.	30	E. M. Hall, 310 Montgomery.	Sept 10
Eureka Con M Co., Nevada	25	H. P. Buss, 101 Sansome.	Jan 9
Great Western M Co., Nevada	25	A. Halsey, 323 Montgomery.	Oct 1
Idaho M Co., Grass Valley	300	Grass Valley.	Aug 4
Mayflower Gravel M Co., California	50	D. M. Kent, 330 Pine.	Aug 20
Pacific Coast Borax Co., California	100	A. H. Clough, 230 Montgomery.	Dec 15
Standard Cons M Co., California	10	J. W. Pew, 310 Pine.	Dec 22

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 10.	WEEK ENDING Dec. 17.	WEEK ENDING Dec. 24.	WEEK ENDING Dec. 31.
Alpha.....	30 .60	60 .60	40 .50	40 .45
Alta.....	75 .90	70 .75	70 .75	75 .90
Andes.....	55 .75	60 .75	55 .75	55 .65
Belcher.....	1.50 1.65	1.55 1.80	1.20 1.55	1.30 1.35
Belle Isle.....	1.30 2.20	2.15 2.35	1.95 2.25	2.00 2.10
Bullion.....	1.30 1.45	1.25 1.65	1.05 1.55	1.15 1.25
Bodie Con.....	60 .70	60 .70	60 .70	60 .70
Bulwer.....	35 .50	40 .50	50 .55	45 .50
Commonwealth.....	40 .50	50 .50	50 .50	45 .50
Cons. Va. & Cal.....	3.65 4.35	3.85 4.40	3.85 4.30	4.05 4.10
Oballange.....	75 .90	80 .85	85 .85	80 .70
Obollar.....	1.15 1.30	1.20 1.45	1.35 1.35	1.00 .90
Confidence.....	2.25 2.10	2.10 2.35	2.10 2.75	2.30 .90
Cons. Imperial.....	45 .10	30 .10	30 .10	30 .10
Caladonia.....	30 .35	35 .35	30 .30	30 .50
Crowa Point.....	80 1.10	85 .95	85 .85	85 .65
Crocker.....	10 .10	10 .10	10 .10	10 .10
Dei Monte.....	250 .40	40 .50	40 .50	40 .50
Eureka Con.....	2.50 .40	40 .65	35 .55	2.30 .55
Eschequer.....	40 .45	40 .65	35 .55	35 .55
Grand Prize.....	10 .15	10 .15	10 .15	10 .15
Gould & Curry.....	1.05 1.15	1.10 1.20	95 .115	95 .100
Hale & Norcross.....	1.15 1.25	1.25 1.5	90 1.35	95 1.00
Julia.....	10 .10	10 .10	10 .10	10 .10
Justice.....	35 .45	35 .40	25 .35	25 .30
Kentuck.....	20 .30	25 .35	20 .25	20 .25
Lady Wash.....	20 .15	20 .15	20 .15	20 .15
Mano.....	35 .50	50 .50	50 .50	50 .50
Mexican.....	1.55 1.95	1.75 1.95	1.50 1.85	1.55 1.60
Nevado.....	10 .15	10 .15	10 .15	10 .15
North Belle Isle.....	40 .10	40 .10	40 .10	40 .10
Nor. Queen.....	45 .55	50 .55	40 .50	40 .50
Occidental.....	2.55 2.85	2.70 2.9	2.55 2.95	2.65 2.80
Ophir.....	1.10 1.40	1.10 1.40	90 1.15	100 1.10
Potosi.....	1.40 1.65	1.45 1.75	1.20 1.70	1.20 1.25
Peerless.....	10 .15	10 .15	10 .15	10 .15
Peer.....	15 .20	15 .25	25 .30	25 .30
Savage.....	1.20 1.90	1.75 1.90	1.30 1.60	1.25 1.30
S. B. & M.....	55 .60	60 .65	40 .55	40 .50
Sierra Nevada.....	1.15 1.20	1.15 1.20	1.10 1.15	1.15 1.75
Silver Hill.....	10 .10	10 .10	10 .10	10 .10
Scorpion.....	15 .10	10 .10	10 .10	10 .10
Union Con.....	1.45 1.75	1.50 1.70	1.35 1.55	1.40 1.55
Utah.....	45 .55	50 .55	35 .50	40 .40
Yellow Jacket.....	1.05 1.40	1.10 1.30	80 1.10	85 .90

Sales at San Francisco Stock Exchange.

WEDNESDAY, December 30, 9:30 A. M.	
100 Alpha Con.....	50c 50c Mono.....
200 Alta.....	35c 100 Potosi.....
200 Chollar.....	9 1/2 10 1/2 Savage.....
250 Cons Cal & Va.....	4 1/2 10 1/2 Seg Belcher.....
100 Crown Point.....	6 1/2 200 Sierra Nevada.....
100 Gould & Curry.....	1 1/2 50 Union Con.....
100 Hale & Norcross.....	35c 50 Utah.....
100 Mexican.....	1.60 100 Yellow Jacket.....

San Francisco Metal and Coal Market.

WEDNESDAY, December 30, 1891.	
ANTIMONY.	
Per lb.....	@ 15 1/2
Refined, in car lots.....	@ 15 1/2
Powdered, do.....	@ 15 1/2
Concentrated, do.....	@ 15 1/2
All grades jobbing at advance.	
COPPER.	
Bolt.....	@ 22
Sheeting.....	@ 22
Ingot, jobbing.....	@ 14
Do, wholesale.....	@ 12 1/2
Fire Box Sales.....	@ 24
IRON.	
Bar, base.....	@ 31
Norway, base.....	@ 54
P. G. IRON.	
Spot Load.....	SPOT FROM LAD—PER TON.
Eglington.....	26 00
Glenbrook.....	26 00
Am. Soft, No. 1.....	25 00
Oregon Pig.....	30 00
Puget Sound.....	30 00
Clay Lane White.....	25 00
Shotta, No. 1.....	26 00
Langhous.....	26 00
Thorncliffe.....	26 00
Gartsherrrie.....	26 00
Barrow.....	26 00
Carroll.....	24 00
BRONZE IRON ORE.	
Per ton.....	@ 10 00
LEAD.	
Fig.....	@ 4 1/2
Bar.....	@ 4 1/2
Sheet.....	@ 4 1/2
Pipe.....	@ 6 1/2
SHOT.	
(Discount 10% on 500 bags.)	
Drop.....	@ 1 1/2
Buck.....	@ 2 1/2
Chilled.....	@ 2 1/2
QUICKSILVER.	
By the Bar.....	@ 47 00
Flasks, old.....	@ 40 00
STEEL.	
English, B.....	@ 16 00
3 1/2" Diam'd tool.....	@ 9 00
Pick & Hammer.....	@ 8 00
Machinery.....	@ 4 00
Toe Calk.....	@ 4 00
TINPLATE.	
Bolt.....	@ 22
Sheeting.....	@ 22
Ingot, jobbing.....	@ 14
Do, wholesale.....	@ 12 1/2
Fire Box Sales.....	@ 24
COAL.	
Eglington.....	26 00
Glenbrook.....	26 00
Am. Soft, No. 1.....	25 00
Oregon Pig.....	30 00
Puget Sound.....	30 00
Clay Lane White.....	25 00
Shotta, No. 1.....	26 00
Langhous.....	26 00
Thorncliffe.....	26 00
Gartsherrrie.....	26 00
Barrow.....	26 00
Carroll.....	24 00
COKE.	
English, to load.....	@ 39 00
Do, spot, in bulk.....	@ 11 00
Do, in sacks.....	@ 13 00

THE LINK BELT MACHINERY CO. of Chicago, whose advertisement appears in the pages of this journal, have lately reduced the prices on their Ewart Detachable Link-Belt, all sizes, nearly 50 per cent from former prices. This concession on the part of the manufacturers of this widely known article will no doubt be hailed with delight by the ore-producing trade, who have been large users in the past of elevating and conveying machinery made by this firm.

Eastern Metal Markets.

By Telegraph.

NEW YORK, December 30.—The following are the closing prices the past week:	
Silver in London.	New York.
Copper.	Lead.
Tin.	
Thursday.....	43 1/2 10 3/4 4 2/8 19 85
Friday.....	43 1/2 10 3/4 4 2/8 19 85
Saturday.....	43 1/2 10 3/4 4 2/8 19 85
Sunday.....	43 1/2 10 3/4 4 2/8 19 85
Tuesday.....	43 1/2 10 3/4 4 2/8 19 85
Wednesday.....	43 1/2 10 3/4 4 2/8 19 85

Quicksilver is steady. Tin is fairly steady. Lead is dull but held at easy prices. Copper advanced slightly but closed weak. Borax is a shade lower. Iron has a strong tone.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. C. HOAG—San Francisco.
R. G. BAILEY—San Francisco.
GEO. WILSON—Sacramento Co.
J. H. CROSSMAN—Perris, Cal.
CHARNICK A. DAYTON—San Lucas, Cal.
G. R. GILL—Cambridge, Cal.
FRANK A. SWEETSER—Colusa Co.
W. E. BRAYTON—San Benito Co.
J. T. AUSTIN—Tulare County.
W. M. HEALD—Clarendale, Cal.
SAMUEL B. CLIFF—Creston, Cal.
W. W. MASON—Nevada.

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Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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THE PIONEER COMMERCIAL SCHOOL.

DELINQUENT SALE NOTICE.

GRAY EAGLE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California. Location of works, Placer county, California. Notice.—There is delinquent upon the following described stock, on account of Assessment (No. 20) levied on the 27th day of October, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	Nn. Shares.	Amt.
Jane A. Armstrong, Trustee.	582	105	\$ 4 20
J. M. Buffington, Trustee.	522	1,040	41 00
W. H. Buffington, Trustee.	512	1,100	44 00
O. H. Bogart, Trustee.	447	5,000	210 00
O. H. Bogart, Trustee.	443	1,000	40 00
O. H. Bogart, Trustee.	449	1,000	40 00
O. H. Bogart, Trustee.	450	1,000	40 00
O. H. Bogart, Trustee.	451	1,000	40 00
O. H. Bogart, Trustee.	453	500	20 00
O. H. Bogart, Trustee.	473	214	8 50
S. E. Brown, Trustee.	387	100	4 00
S. E. Brown, Trustee.	312	5 0	20 00
S. E. Brown, Trustee.	336	615	20 00
A. W. Barrows, Trustee.	547	1,000	40 00
A. W. Barrows, Trustee.	550	100	4 00
A. W. Barrows, Trustee.	555	271	10 84
A. W. Barrows, Trustee.	556	504	20 00
A. W. Barrows, Trustee.	559	1,000	40 00
A. W. Barrows, Trustee.	563	500	20 00
A. W. Barrows, Trustee.	564	500	20 00
A. W. Barrows, Trustee.	568	1,000	40 00
A. W. Barrows, Trustee.	573	100	4 10
A. W. Barrows, Trustee.	576	500	20 00
A. W. Barrows, Trustee.	579	200	8 00
A. W. Barrows, Trustee.	598	500	20 00
A. W. Barrows, Trustee.	599	500	20 00
A. W. Barrows, Trustee.	600	300	12 10
A. W. Barrows, Trustee.	601	200	8 00
A. W. Barrows, Trustee.	603	500	20 01
A. W. Barrows, Trustee.	610	500	20 00
A. W. Barrows, Trustee.	611	500	20 00
A. W. Barrows, Trustee.	625	50	2 00
A. W. Barrows, Trustee.	627	25	1 00
A. W. Barrows, Trustee.	632	500	20 00
W. A. Carnes, Trustee.	282	416	16 64
H. L. Francis, Trustee.	591	1,100	44 00
W. E. Lane, Trustee.	593	200	8 00
H. W. Nash, Trustee.	200	104	4 16
H. M. Rockman, Trustee.	39	600	24 00
W. A. Searles, Trustee.	226	445	25 80
W. A. Searles, Trustee.	316	1,000	40 00
W. A. Searles, Trustee.	321	250	10 00
W. A. Searles, Trustee.	454	215	8 60
W. A. Searles, Trustee.	513	1,000	40 00
W. A. Searles, Trustee.	519	600	24 24
W. A. Searles, Trustee.	542	100	4 00
C. S. Stout, Trustee.	416	2,000	80 00
C. S. Stout, Trustee.	477	553	34 12
Mrs. M. E. Stout, Trustee.	170	500	20 00
Mrs. M. E. Stout, Trustee.	184	100	20 00
J. N. Taylor, Trustee.	532	1,040	41 60

And in accordance with law, and an order of the Board of Directors, made on the 27th day of October, 1891, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 11, No. 303 California street, San Francisco, California, on MONDAY, the 21st day of December, 1891, at the hour of one (1) o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expense of the sale.

A. W. BARROWS, Secretary.
Office, Room 11, No. 303 California street, San Francisco, California.

At a meeting of the Directors of the Gray Eagle Mining Company, held to-day, the day of sale of the above delinquent assessment was postponed to THURSDAY, January 7, 1892, at one o'clock P. M. at the office of the Company, Room 11, 303 California Street, San Francisco, California.
A. W. BARROWS, Secretary.
San Francisco, Dec. 21, 1891.

DELINQUENT SALE NOTICE.

CALIFORNIA CREAMERY COMPANY.—LOCATION of principal place of business, San Francisco, California. Location of works, Novato, Marin County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of November, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	Nn. Shares.	Amt.
Kaupisch, Julius.	3	80	\$2,400 00
Kaupisch, Frank M.	4	80	2,400 00

And in accordance with law, and an order of the Board of Directors, made on the 21 day of November, 1891, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, 111 Front Street, San Francisco, on MONDAY, the 11th day of January, 1892, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with cost of advertising and expenses of sale.
CHAS. MERSFELDER, Secretary.
Office, No. 111 Front Street, San Francisco, California.

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The German Savings and Loan Society,
528 California Street.

FOR THE HALF YEAR ENDING DECEMBER 31, 1891, a dividend has been declared at the rate of five and four-tenths (5 4/10) per cent. per annum on Term Deposits, and four and one-half (4 1/2) per cent. per annum on Ordinary Deposits, payable on and after SATURDAY, January 2, 1892.
GEO. TOURNEY, Secretary.

DIVIDEND NOTICE.
SAN FRANCISCO SAVINGS UNION, 832 CALIFORNIA ST., corner Webb; branch, 1700 Market St., cor. Polk.
For the half year ending with December 31, 1891, a dividend has been declared at the rate of five and four-tenths (5 4/10) per cent. per annum on term deposits, and four and one-half (4 1/2) per cent. per annum on ordinary deposits, free of taxes, payable on and after SATURDAY, January 2, 1892.
LOVELL WHITE, Cashier.

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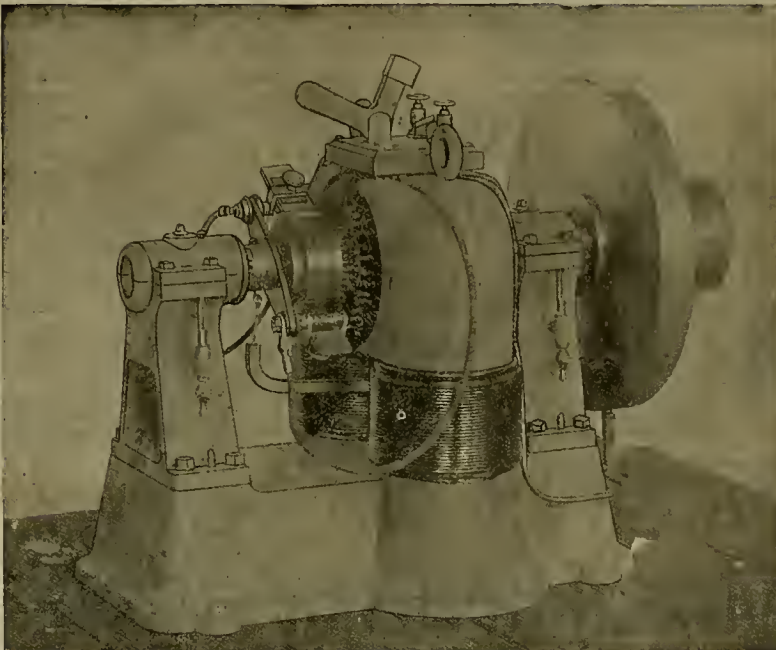
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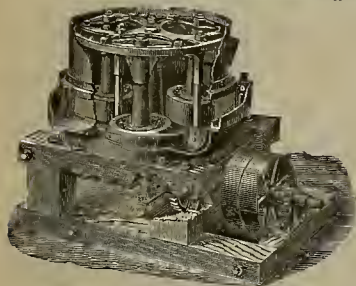
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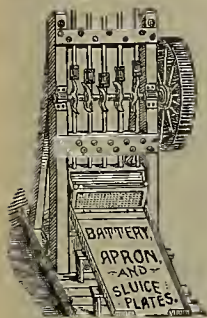
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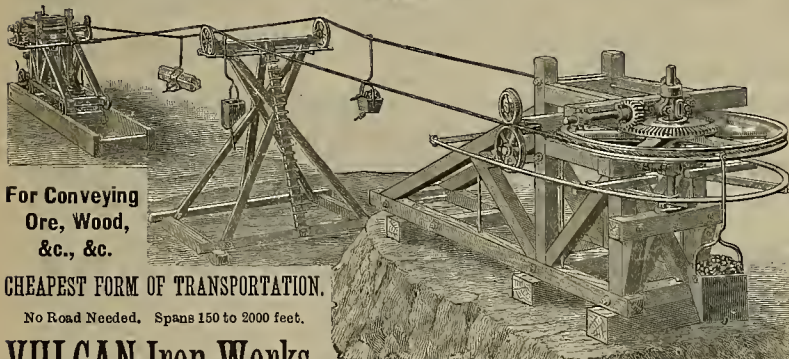
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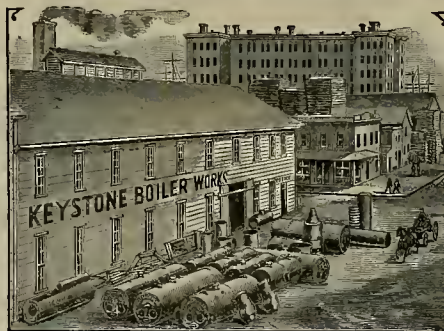
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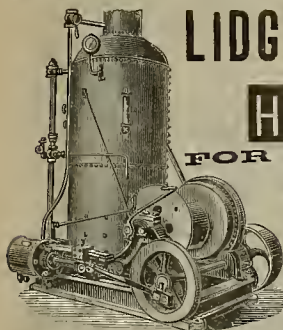
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SAN FRANCISCO, CAL.

GOOD NEWS FOR THE BLIND.

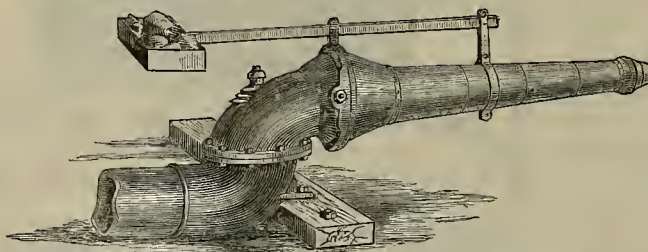
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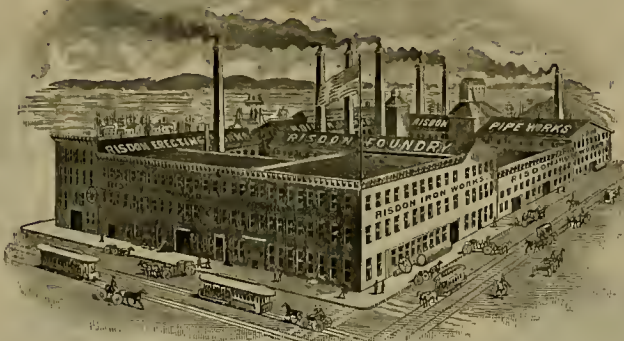
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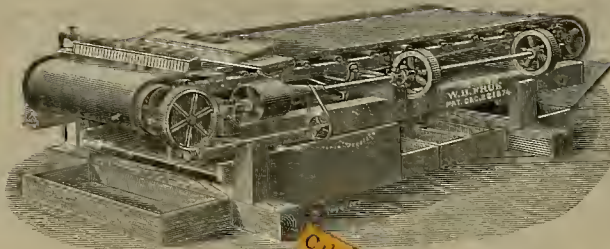
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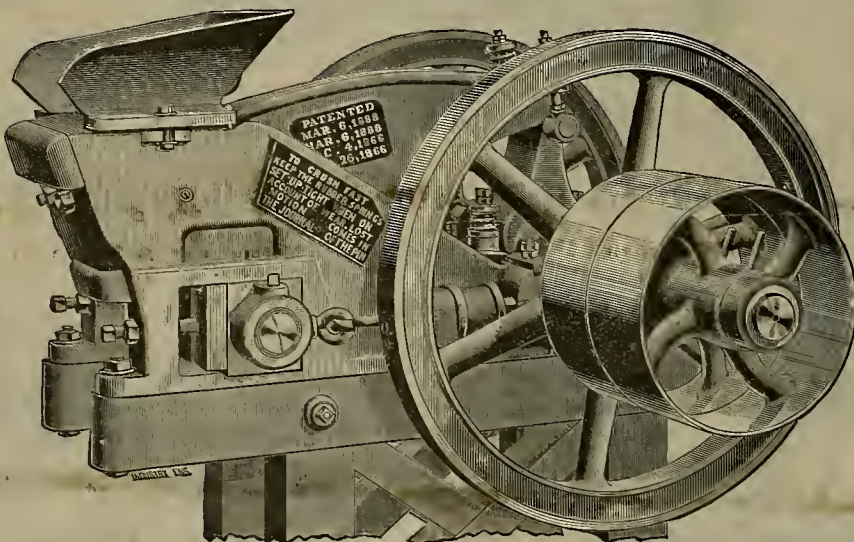
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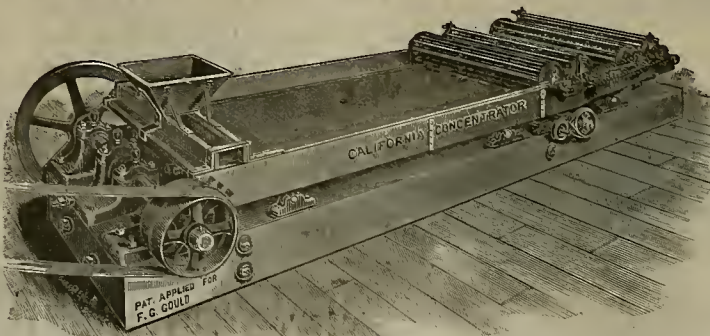
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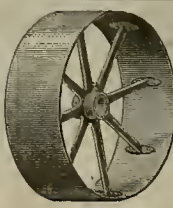
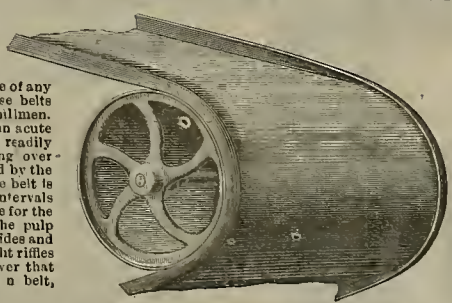
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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV.—Number 2.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JANUARY 9, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

amount of salt needed for proper chlorination is added before the pulp enters the cylinder.

The furnace is entirely mechanical and continuous in action, and consists of a long cast iron cylinder, made in sections to facilitate handling and transportation, and is lined at the mill with firebrick throughout its entire length. Several courses of these brick project beyond the others, so that in passing through,

gears and pulleys. The fire-box is placed at the lower end of the cylinder, flame passing directly into it; and, as the pulp passes through from the upper end, it is subjected to a gradual increase in the intensity of the heat until it is discharged into the bin under the fire-box. At the bottom of the bin the pulp passes through an opening onto a cast-iron table, over which heavy iron scrapers slowly move, discharging

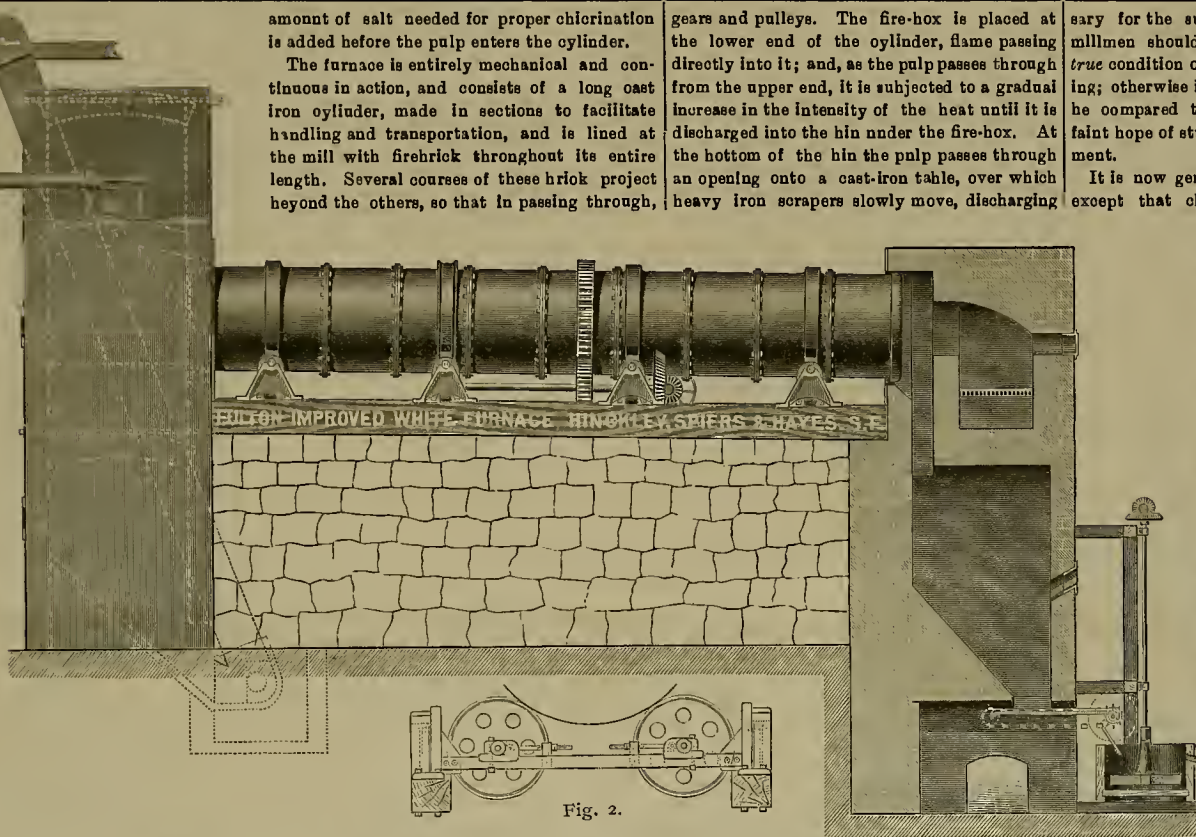
sary for the success of their operations that millmen should have close knowledge of the true condition of the material they are working; otherwise it is all speculation, and can but be compared to groping in the dark, with a faint hope of stumbling upon the right treatment.

It is now generally believed that all gold, except that chemically combined with tellurium, exists in a metallic state in metalliferous veins or lodes. In some of the oldest works on metallurgy the same opinion was entertained. For instance, in "Baron Ingo Boen's New Process of Amalgamation," published in 1791, he says: "Bergman, whose name will be immortal in chemistry, and whose opinion may be taken for that of all the chemists together, sets forth that mineralization requires the presence of a menstruum, which, dissolving the metals, deprives them of their form and appearance; and all the other combinations of metals, as likewise the disguises of native metals in different sorts of stone and matrices, are but so many different mixtures. From these ideas, very naturally arises that common division of metals into native, (nativa) disguised, (larvata) and mineralized (mineralizata).

In a note at the end of the same section, he says: "I use here the name of gold ores without employing the least idea of their mineralization or calciform state, which, in my opinion, never exists. I mean to express that gold particles, small and indivisible, are disguised in them and wrapt up in other minerals."

Richard Kirwan in his "Elements of Mineralogy published in 1796" absolutely denies the mineralization of gold, and says: "Gold being incapable in low heats of uniting with pure air, sulphur, arsenic or any acid furnished by nature, it is plain it can never be mineralized in the strict sense of the word."

We have quoted from these old authorities to show that the question of gold ores is by no means new.



FULTON IMPROVED WHITE ROASTING FURNACE, WITH AUTOMATIC DISCHARGE AND MIXER.

Ore-Drier and Roasting Furnace.

The style of revolving ore-drier shown on this page is almost entirely used in dry-crushing mills, handling large amounts of ore. It is used for drying the ore as it comes from the mine, and after being crushed by the rock-breakers, taking the place of cast iron dry floor-plates. The cast-iron cylinder is made in sections and of a larger diameter at the fire end than at the opposite, into which the ore is fed. This being the case, and the axes of the cylinder being horizontal, as it slowly revolves, the ore gradually travels toward the fire end and is finally discharged into bins ready for being crushed dry in the batteries. Shelves, running lengthwise, are attached to the inside of cylinder, by means of which the ore is raised as cylinder revolves, and is dropped through the flame, which materially assists in drying the ore. The cylinder is driven by gears, as shown, and is supported on four rollers.

The other engraving represents the White roasting furnace with improvements made by the Fulton Iron Works of this city (manufacturers of both these devices). The improvements added to the original furnace greatly facilitate the handling and adjusting of the cylinder, and also the discharge of the roasted ore from the bin. The ore from the batteries is elevated into the hopper shown above the furnace, and is from there taken by a conveyor and fed into the upper end of the cylinder. The

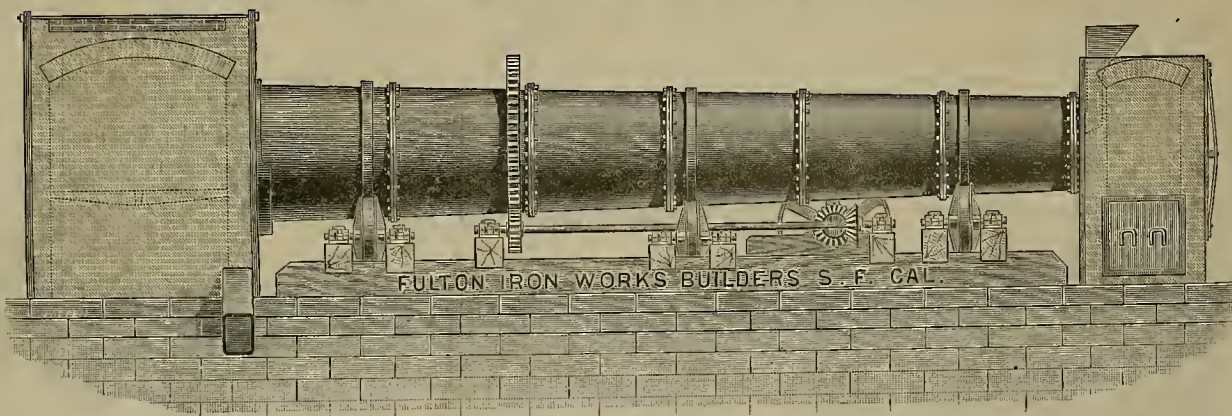
the pulp is raised by the turning of the cylinder and showered through the flame. As will be seen, the roasting cylinder has a slight inclination, and is supported by and revolves upon four sets of rollers. The distance at which these rollers are set apart determines the inclination of cylinder, and consequently the inclination can be varied at pleasure, as will be seen in Fig. 2. As the frames carrying the rollers are supported in trunion bearings, they at once adjust themselves to the angle of the cylinder. This change in the inclination of the cylinder of course directly affects the length of time the pulp is retained in it, and the pulp can in this way be roasted for a longer or shorter period, as may be necessary.

Motion is given to the cylinder by means of

the ore into a mixer or tank, in which stirrers thoroughly mix it with water, which is here introduced, and is then led to pans in a pipe or sluice. The speed with which the scrapers move across the face of the table can be adjusted to suit the discharge from furnace. The dust carried out of upper end of cylinder is collected in dust chambers having their sides inclined to the foot of an elevator, by which it is carried up to hopper above furnace, and again goes through with the ore.

Mineralization of Gold.

On page 27 of this number of the PRESS, is an article on the occurrence of a natural sulphide of gold, which is of more than passing importance. It would seem absolutely neces-



REVOLVING ORE DRYER FOR DRY CRUSHING MILLS.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—EDS.

Certain Ore Deposits.

[Written for the PRESS by W. H. STORMS.]

In Southern California and Arizona is a class of ore deposits which seems to be confined, in the United States at least, to this southwestern section. The deposits to which I particularly refer are those which occur in igneous rocks, and which are of the type that Mr. Geo. F. Becker has so aptly denominated "chambered veins."

While these ore deposits are somewhat similar, geologically, their mineral contents and other characteristics are so distinctly separate as to entitle some of them to particular mention.

One of the most interesting of this class of ore deposits occurs in the

Lava Beds District.

About 35 miles east of Daggett, in San Bernardino county, California, and is commonly known as Halberg's gold mine. The extreme richness of some of the ore from this mine attracted considerable attention two or three years since and led to considerable work being done on the deposit in question and others in the district.

The mine is situated in a rugged, verdureless desert mountain range, on one of the outer ridges, and may be approached to within a few hundred feet by wagon-road.

The entire mountain region, as far as I observed, is composed of igneous rocks, the main mass being aenitic—a uniformly fine-grained rock of light-gray color.

Traversing this formation are broad dykes of a later diorite, accompanying which are smaller intrusive masses of a fine-grained, dark, basaltic rock, having a rusty brown color where exposed, but dark-green where unweathered.

The aenitic rock and the diorite resemble each other somewhat at a casual glance, but a closer inspection reveals a very decided difference in their appearance. The diorite is decidedly porphyritic, containing many small crystals of feldspar in a fine-grained, greenish-gray ground mass, while the aenitic has a decidedly granitic structure, containing no uncrystalline ground mass. It is in one of

These Intrusive Dykes of Diorite

That the Halberg mine occurs. This particular dyke has a strike north of east and south of west. Since the intrusion of this igneous mass, dynamic forces have been at work in the region and extensive fracturing and faulting has been the result. The Halberg dyke, as I may call it, has been faulted along the direction of its strike for several hundred feet, and it is along this fault plane that the ore deposition has taken place.

The faulting of the dyke has been accompanied in places by an extensive crushing of the adjacent country rock on the hanging-wall side of the dip. In these crushed zones, ore deposition has found superior conditions. Several of these chambers of crushed and broken rock occur along the plane of the fault, and in each instance, ore deposition to a greater or less extent has resulted.

The "Ore Chambers"

Consist of masses of crushed and brecciated fragments of the diorite, portions of which still show the original porphyritic structure of the rock.

The ore of the Halberg gold mine is a somewhat unusual combination of minerals, which are very evidently the secondary products of what were originally sulphides, together with native gold, which constitutes the chief value of the ore. These minerals are hematite, limonite, magnetite, malachite, azurite, crysocholla, cerussite, wulfenite, chloride of silver and thin incrustations of antimonial oxide and holok manganese oxide, the latter in apangles and flakes.

In these zones, or chambers, the diorite has undergone an extensive process of metamorphism, resulting in most places in a complete physioal and mineralogical change. The diorite has by replacement given place to solid ore, or has been alloyed to a dense quartzose rock, while in other instances kaolinization seems to have been the result, though to a limited extent. Concerning the

Origin of These Ore Deposits

There seems to be little reason to doubt that they were derived from circulating mineral waters, which in passing through the diorite dissolved the mineral constituents of that rock mass and carried them in solution to the ore-chambers formed by the fault, where ascending, or descending, or possibly both, they concentrated in the crushed zones, forming "chambered veins," those localities being the most favorable to ore deposition—the large exposure of rock faces, and particularly the crushed portions of the zones, affording superior conditions for the metasomatic interchange of mineral atoms.

In the pulverized or finely crushed portions the ore deposition has been the most complete, entirely replacing the original rock; while in the brecciated parts the ore occurs more in the nature of incrustations, or impregnations, more or less completely filling the interstitial space and extending into the rock masses themselves.

The principal ore body is something over 100 feet in length, varying in width from 20 feet near the central portion to a few inches at either end, and also thinning out in depth, resembling a great plano-convex lens, the upper portion having been removed by erosion. Along the fault plane the line of demarcation between the ore and the country rock is very distinct, but on the opposite side of the ore body the mineralization gradually gives place to the normal diorite, changing by insensible gradations from ore to barren rock.

The ore has a most striking appearance, exhibiting the brecciated structure clearly, the fragments being colored various shades of green, white, pink, red and brown or yellow. It would make a beautiful ornamental stone, as it takes a high polish.

Another Peculiarity of this Ore

Is its deceptive nature as to value. One may select two pieces as much alike as possible, as far as may be seen, and one will perhaps assay \$500 a ton and the companion piece not more than \$5. Some of the ore has returned assays over \$3000, which gave little indication of its extreme richness physically. The average range of value, however, is between \$20 and \$40 per ton, an ounce of gold usually being accompanied by an ounce of silver. In one shaft high assays in silver have been obtained, the ore containing comparatively little gold, though this ore did not differ essentially from that of other portions of the deposit in appearance.

In the same district, about a thousand yards distant from the ore deposit above described, is another notable occurrence of ore deposition, which in some respects is a counterpart of the Halberg gold mine, though entirely unlike it in many important features. Here, too, the ore deposit occurs in a dyke of diorite along a line of fracture, the origin of the ore being similar in every respect to that previously described, the deposition of the mineral from circulating waters and the substitution of ore for diorite, as at the gold mine.

Here the Faulting

Seems to have consisted of several parallel fractures, and a consequent displacement, and fracturing and crushing of the rock mass included between the outer planes of the fault, the width of the zone varying from six to ten feet, and at one place 14 feet. Within this space the ore deposition has taken place, in some instances extending entirely across the fractured zone and at others limited to one of the interior faulting planes. As ore deposition has been not extended beyond the limits of the outer planes of fault, it has resulted in giving the ore body the appearance of a fissure vein with walls, the fault planes within the bounding "walls" being plainly discernible, still further carrying out the impression of its being a true fissure by giving it a banded structure.

While undoubtedly the vein is of the fissure type, it is not the "true fissure" of the textbook—an ore deposit occupying a preexisting crevice. Doubtless the fault plane extends to great depth, though longitudinally it can only be followed by a succession of ore deposits similar to the one in question. They are separated, however, by several hundred feet of barren, unchanged diorite, no line of displacement being visible.

In this mine, the ore is almost exclusively silver-bearing—rock assaying 60 ounces silver, carrying but two-tenths or three-tenths ounces of gold.

Its Average Value

Is about \$20, and at the time of my visit, about \$16,000 was standing in eight in the mine. The variety of minerals is confined almost exclusively to the oxides of iron, yellow, red and brown. Lead and copper occur very sparingly, and the ore where oxidized is perfectly free, the silver being in the form of chlorides.

At a depth of 70 feet from the surface croppings, the ore shows considerable change, the porous oxidized material giving place to some extent to a siliceous close-grained rock, which in appearance resembles a siliceous felsite. This rock is doubtless the ore in its normal condition, as it is thoroughly impregnated with fine crystals of iron sulphide. Doubtless at a few feet below the point mentioned, the oxidized ore will give place entirely to this low-grade cherty sulphide rock. The same change occurs at either end of the ore bodies—a gradual replacement of the ore by the siliceous rock and a gradation into the diorite.

There is little reason to expect the occurrence of rich accumulations of oxidized ore in depth, as a thorough draining and oxidation of the ore seems to be the essential characteristics of ore of value, and these conditions cannot obtain in depth.

The Richness of the Surface Ores

Is due entirely to the decomposition of the sulphides, and the concentration of the minerals in the soft, porous portions of the deposit, a large portion having perhaps been derived from that portion of the deposit which has been gradually removed by erosion—as the decomposition went on the mineral solutions continued deeper and deeper into the rock beneath, forming concentrated masses of considerable richness.

The Miners' Convention.

EDITORS PRESS:—One breathes freer when he reads of the contemplated Miners' Convention, to be held Jan. 20th. It is not little in itself, still it shows that the miners of this State have awakened, and are not going to allow their rights to be so overridden by courts and Government officials without an unmistakable protest. All credit to Placer county. A State organization will consolidate the mining interest of the State into business shape, through which efficient work can be done. The miners' power is daily on the increase, and if times raid the business community and granger much harder, the mining fraternity will increase at a fast rate.

The loss of \$100,000,000 to California business circulation means a great deal. That our gold product must be increased, or we are on the eve of a financial crisis, is apparent to every business man. The whole country is growing too fast for the metallic output, and especially the output of gold. Our per capita circulation is too small for the amount of business, and the power that he in finance say silver must not be coined, except as it is supported by gold. Shut out the further supply of gold, then what? Even the granger, who has his farm so heavily mortgaged that he sees no clear road open for the payment of principal and interest, will soon awaken to the folly of his opposition to an equitable adjustment of the present difficulty.

But my purpose when I took up the pen was to say, in advance, that the coming convention being the first, and as there is likely to be a very large body of representative men present, that there should be brought before the body not only matters pertaining to the question of working hydraulic and drift mines, and the land question, but other matters should be considered pertaining to the advancement of mining, all of which could be made interesting and instructive. The silver question should receive due attention. In other words, don't have a one-idea convention. ALMARIN B. PAUL, Dec., 1891.

Miners' Wages and Silver.

The following suggestive paragraphs are taken from the annual report of Supt. Shockey, of the Mount Diablo M. & M. Co., Colomhus district, Nevada.

Prior to 1835, miners' wages in Candelaria had been \$4 per day, the price of silver having been for the years before that between \$1.14 in 1830 and \$1.14 in 1834. In 1835, silver began to go down, and in July of that year the price was \$1.07. At this time the companies operating in this camp decided that they could pay miners but \$3 per day, and the mines closed down. In September of the same year the miners accepted these terms, and the companies resumed operations. This rate of wages was paid till August, 1890, when the price of silver, which had averaged 99 cents to 1886, 98 cents in 1887, 94 cents 1888 (dropping to 91 cents in May of that year), and 93 cents in 1889, advanced to \$1.21 per ounce, and the miners demanded that their wages be raised to \$3.50 per day, and as the companies could well afford the increase with silver at that price the request was granted. Since that date silver has been almost uniformly declining, and it has been nearly impossible for the companies to make any profit under the existing conditions, and under these circumstances it was thought best to offer the following scale of wages to the men, which was done on Nov. 24, 1891:

"In view of the continued low price of silver the Directors of the Mount Diablo Mill & Mining Co. and the Trustees of the Holmes Mining Co. have decided to offer the following scale of wages to the miners in their employ. To take effect on the first day of December, 1891:

"The amount of a day's pay shall be fixed on the first day of each month, and shall be based on the average price of silver for the preceding month.

"When such average shall be \$1.07 per ounce or more the day's pay shall be \$3.50.

"When such average shall be less than \$1.07 per ounce the day's pay shall be \$3.

"Should silver go to par (\$1.2922 per ounce) the day's pay shall be \$4."

The scale was rejected by the miners at a meeting held on Nov. 27th, at which they passed the following resolution:

"It was moved and seconded that we, the miners of Columbus Mining District, shall not work for any mining company for less compensation than three dollars and 50-100 (\$3.50) per day."

Under the instructions of the Directors I closed down the mine down on the night of Nov. 30th, and placed the mine in charge of watchmen.

The Holmes mine is also closed down, and there are now no miners working in the camp.

VEGETABLE FLANNEL.—Germany contains a number of establishments engaged in the manufacture of flannel and similar textiles from pine leaves, the articles made being used in hospitals, barracks, etc., owing to the fact that no vermin can lodge in them. When spun and woven, this material resembles hemp, and it may be employed in making many articles of wearing apparel, as the goods are comfortably warm and solid.

New Almaden Mines.

Brief History of a Great Mining Property.

The famous quicksilver mines of New Almaden are located about 15 miles south of San Jose, in the Santa Cruz mountains. The company own 7800 acres of land, and the history of their ownership is not uninteresting. From the earliest times of which the Spanish traditions speak, the site of the present mine was a favorite resort of the natives who used the vermilion there found for the ornamentation of their bodies. The first attempts at reducing the ore itself were probably made in 1545, and were of the rudest and simplest character. In 1847, the firm of Barron & Forhea of Teplo, Mexico, became the owners of the mine, and its extensive operations began in about 1850. As the ore was exposed and the importance of the deposit understood, a great flood of litigation began and continued for many years. During the years between 1858 and 1861, the mine was closed by an injunction issued during this litigation. In 1864, the various contests were adjusted by purchase and compromise, and the whole property passed into the hands of a single company. In 1870, the mines came under the management of J. B. Randol, to whose skillful and able conduct was due the great prosperity in succeeding years.

The annual reports of the company, says the San Jose Mercury, from which we take this article, tell the whole story how the company up to the year 1870 encountered disaster, and had then accumulated an indebtedness of \$1,600,000, and bankruptcy seemed imminent. By a supreme effort, the company raised a final \$200,000 on preferred stock, and J. B. Randol, who had for years been secretary of the company at New York, was sent to the mine as its manager, and the company entered upon a prosperous career. Its business has been conducted with intelligence, skill and economy, and its directors, recognizing the rights of stockholders, whose trustees they are, give them the fullest information, so that each may know exactly how their property is being administered, and where his money goes.

The quicksilver industry of the world is confined to very few hands. The three most important mines in the world which have been worked up to the present time are the great Almaden mines in Spain, the Idria mine in Austria, and our own wonderful mine at New Almaden. The affairs of the foreign mines are conducted in the secret manner which generally prevails abroad, and which is still (although the fact is to be regretted) largely practiced in some American mines. This secrecy is nominally "for business or trade reasons," and consequently the New Almaden Company could have found an unusually good excuse for following the same course here. The company, however, has made no secret of its receipts and itemized expenses, and, as a consequence, perhaps, it has been one of the most economically managed mines in the world.

Compared with the results attained at the Spanish Almaden, the California work demonstrates the value of intelligence in workmen, and the superiority of the plan of frank and open business methods over the old methods of mystery, which come still apparently believe to be necessary to the successful management of affairs in mining enterprises. Too much praise cannot be heaped upon Mr. Randol, the manager of the New Almaden mines, for demonstrating these wholesome truths, and for the clean and able administration of his trust.

The great Almaden mine of Spain is said to have been discovered 400 years B. C. and has been in course of profitable development for 22 centuries, and is now thought to contain enough quicksilver to supply the entire world for the next 50 years. It is the most perfect deposit of metal of any kind ever discovered, and after all these centuries of operations still remains the richest mine in the world.

The Idria mine in South Austria, was discovered at the close of the fifteenth century. Next to the Almaden, this is the richest mine now known, the bottom of its lode showing no diminution either in the quantity or quality of its ore. For 63 years ending in 1880 its average yearly profits were \$164,000. Its reserves of ore are estimated at 900,000 flasks of seventy-six and one-half pounds each.

These two mines are respectively owned and controlled by the Spanish and Austrian governments, and worked for their account; their policy always having been wise and conservative in producing only sufficient metal to supply the demand at good prices, having large reserves and invariably holding their surplus products for a good market. These facts about the Spanish and Austrian mines have been cited that a comparison may be made with the New Almaden Mines conducted under liberal management upon American principles.

The entire underground-workings that has been accomplished in the Spanish mine can be comprised in a rectangle 700 feet long, 350 feet broad and 1027 feet deep, while from 1864 to 1891 the records of the New Almaden show that the number of feet of drifting and sinking in the mine amounted to 47,822 miles, which does not include the excavation made in extracting the ore during the period named, while the ground opened up the previous period from 1850 to 1864 amounts to 15 miles more.

The records show that in 1835 eight times the amount of material was extracted from the American mine that was taken from the Span-

ish mine in 1883, its production, however, averaging only 20 pounds of quicksilver per ton for that year, while the Spanish mine's production was 200 pounds per ton; that the average number of tons handled for each worker in the Spanish mine was only 6.23 tons, while at the American mine there was extracted over 63 tons per worker, or ten times the amount extracted in equal time; that the cost of production of the Spanish mine was .27 of that of the American mine. It costs no more to extract and reduce rich ore than poor, and were the American ore equal in richness to the Spanish, the production of the American mines would have been ten times as great, and cost \$2.64 per flask. Add for flasking \$1, and we have \$3.64 as the cost of production, as against \$7.10 in the Spanish Almaden and as only 425 men were employed in the New Almaden mines, as against 3126 in the Spanish, it forms a striking illustration of the benefits to be derived from intelligent and well-paid labor, and from skilful and economical management.

The excellence of this management is not confined to economical production of mineral, but New Almaden, in its care for its workmen, providing for them hospital, club-room, reading-room, and everything tending to elevate them, intellectually and morally, offers an example well worthy of study and imitation. The population has been about 2000, the majority of whom were foreigners, principally Cornish and Mexican. Nearly 500 men were employed in the mines until recently.

The land on which the town is built belongs exclusively to the mining company, and only such persons as are desirable are permitted to rent or occupy any of the cottages. The outer portion of the town, where the postoffice, express office, hotel, stores, etc., are located, is an open town, but beyond this is a gate through which none are allowed to enter without a permit. This rule was established to prevent the carrying of liquor to the miners. The town is in reality two towns, known respectively as Almaden-on-the-Hill and Hacienda. The upper town is around the shafts of the mines, and the lower town about the reduction works. The lower town is exceedingly handsome. A clear stream from the mountains is carried along the main street, from which water is obtained to irrigate the tasteful flower gardens which surround the pretty residences. Over-arching trees furnish a grateful shade, and shrubs and plants in luxuriant profusion beautify this mountain town, which lies 1700 feet above tide water. The stately mansion of the superintendent is called the Hacienda. The town is approached by a good road rising in easy grades, from various points of which superb glimpses of the valley are obtained as it winds its picturesque way about the rugged hills. Taken as a whole, new Almaden is one of the most interesting mining communities in the world.

The earnings of the New Almaden mines from Jan. 1, 1871, to Dec. 31, 1890, were \$14,597,875.47, while the operating expenses were \$9,367,356.89, leaving profits of \$5,230,518.58. Of these profits a million dollars have been expended in California in real estate, improvements and necessary legal expenses.

The production of quicksilver at the New Almaden mines is less for the year 1891 than in any previous year of their existence. The product in flasks containing 76½ pounds quicksilver each, is shown monthly in the following table:

	Flasks
January.....	850
February.....	814
March.....	857
April.....	963
May.....	800
June.....	700
July.....	645
August.....	620
September.....	500
October.....	500
November.....	450
December.....	426
Total.....	8000

If we add these 8000 flasks to the 916 459 flasks previously produced, we have a total of 924,459 flasks as the output of these mines since they were opened in 1850.

Men must die and so must mines, and it now appears that New Almaden is approaching the end of its long and prosperous career, for its ore has largely fallen off, both in quantity and quality, until, in order to keep expenses somewhere near receipts, many men have been recently discharged and expenditures reduced to the lowest possible limits at all points.

Butte County Miners.

On the 28th ult. there was a meeting at Oroville of miners and those interested in mining, and the following were selected as delegates to attend the State Mining Convention: W. C. Hendrick, N. A. Harris, C. F. Lott, Col. F. McLaughlin, E. B. Price, John Gale, D. K. Perkins, John Hemesley, W. E. Duncan Sr., H. V. Rearden, C. G. Ferguson, S. McClellan, A. Ekman, L. Laaster, G. O. Hunter, W. H. Fowler, C. C. Balding, W. J. Herrin, E. W. Fogg, H. P. Stowe, J. Morgan, John Wagner, Jo. Hendley, Wm. McIntyre, E. McGrath, J. P. Woods, L. Burwell, A. P. Frary, Wm. James, C. J. Nickerson.

Among others, the following resolution was adopted:

Resolved, That the Butte county delegates to the State Miners' Convention are hereby instructed to use their influence to procure a joint convention of the miners and farmers of the State, to be held at such a place and on

such a date as may be agreed upon, to adjust the differences existing between the two great industries.

On motion of H. V. Rearden, the following committee was appointed to draft a call for a permanent Miners' Association in Butte: W. E. Duncan Sr., E. B. Price, T. W. Reese, C. F. Lott and J. Patterson.

Develop the Waterways.

We are glad to see that propositions for improving our watercourses and supplementing them with navigable canals where necessary are attracting more attention than formerly. The truth of the claim that water is the natural protection against the extortion of rail-owners should be made the most of, has always been acknowledged in a perfunctory manner, but, like other truths, it is of little account until men begin to act upon it. Just now the time seems to be auspicious for a more thorough discussion than has yet been had, also for adopting plans of action involving State and Governmental appropriation and assumption of individual obligations, which shall result in facilities for water traffic wide-reaching and effective.

There should be general and systematic action on this subject, including little streams and sloughs reaching from our bays into productive regions, and including also great schemes for bringing the most remote interior valley points into water communication with tide-water wherever there is water to float a barge and land rich enough to fill it with produce. Of course, all this perhaps cannot be done in a generation, but fortunately some very great undertakings can be accomplished within a reasonable time and with a reasonable expenditure of funds. Why should the great Santa Clara valley and its thriving city of San Jose be dependent for outlet of its produce upon three lines of rail all owned by one company, while a short canal would make it a port upon one of the grandest bays in the world?

It is fortunate that the great San Joaquin valley is awakening to the fact that its vast industries and splendid future should not be controlled by one single track railway. Other railways are talked of, it is true, and there should be others, and yet the possibility of water traffic nearly the whole length of the valley is within reach at quite a moderate cost. We have been interested in reading a good article on this subject in the *Fresno Central Californian* of Dec. 26. It speaks at length of the productive capacity of the region, to show that a waterway composed of rivers, sloughs and canals, could be made profitable as a business enterprise. It then outlines a plan by which the work could be accomplished, as follows:

The canal is a public enterprise, and we believe should be built and maintained at public expense. San Joaquin, Stanislaus, Merced, Fresno, Tulare and Kern counties should unite in building and operating the canal, and thus secure the greatest possible benefits to the citizens of these counties. A tax should be levied upon all the taxable properties of the six counties to construct and equip the canal, and a Board of Directors, consisting of one member from each county and one at large, to be elected by the people, should manage the traffic. Rates can then be fixed so as to derive a revenue barely sufficient to meet operating expenses, and low freight charges would be permanently guaranteed to the people of this valley. Estimating the cost of building the canal at \$6500 per mile, and its total length from Stockton to Bakersfield at 220 miles, it would require \$1,430,000 to construct it. The taxable property in the six counties above named is upward of \$165,000,000. A direct tax of 92 cents on the \$100 valuation would yield \$1,435,000 in a single year, or enough to build the entire canal; but there are other favorable circumstances to be considered, the first of which is that the river channel can be used with slight improvement from near Stockton to Firebaugh's, a distance of say 75 miles. Any expense necessary for the improvement of the river channel should be covered by Congressional appropriation, and in all probability would be. Then there would remain only 130 miles of canal to be actually constructed, allowing for 15 miles of deep water in Tulare lake. Twenty-five miles more between the lake and the river would only require the deepening of the present channel of Fresno slough, so that the actual expense of constructing the canal would not in all probability amount to more than 120 miles at \$5500 per mile, or a total of \$780,000. A direct tax of 50 cents on the \$100 valuation in the six counties would yield this amount. To make the tax as light as possible, however, it might be advisable to collect only one-fifth each year for a term of five years. That the people of the six counties to be benefited would voluntarily tax themselves for this purpose we believe goes without question, hence the *Central Californian* will advocate making the great San Joaquin valley canal a public enterprise.

We do not undertake to say that this would be the best way to carry out such an undertaking, that is a matter for consideration. At the same time, the figures, which we take it for granted are reasonably accurate, show that it would not be a difficult matter to make the whole San Joaquin valley independent of railway domination and extortion, which is now the chief barrier to its progress. Such subjects as that taken up by our Fresno contemporary should be inquired into by all public journals and public-spirited individuals. This question of relief by water for extortionate railway charges will yield to discussion and to cooperative action, and such force should not be denied it.

THE SMALLEST TREE that grows in Europe is the dwarf willow. When at maturity, it is only a few inches high.

The Local Coal Market.

We are indebted to I. Stenart for the following review of the local coal market for the past year:

The total receipts of coal in California during 1891 exceeded those of any previous year, with the result that the total average cost of fuel consumed in this State represents during the past year something in the neighborhood of \$1,700,000 less than in 1890. This saving means much to a locality so heavily handicapped for want of natural resources of fuel for its manufactures.

It is of great moment to this State that the taxation to which its people are subjected should cease, a taxation not home or felt to any similar extent by any other State in the Union. I refer to the Government duty of 75 cents per ton on foreign coal. During the past decade our State has paid, directly or indirectly, to the Government, probably not less than \$12,000,000, and with our increased growth it will, for a like period in future, pay much more. We need for our manufacturing industries, railroads, steamships, etc., a class of fuel that the domestic coal mines on the coast cannot supply. We want cheaper fuel for our homes. This is a question that affects every soul in this State, and its import can be grasped by even the dullest minds. The removal of this tax (a distinct burden on California), should be demanded in no uncertain tones of our legislators, and the result of the coming national election in this State may probably hinge on the position assumed by either of the political parties in regard to this matter.

Turning now to the prospect of the future, it might be said that, judging from the fluctuations in value experienced every year, it is impossible to prognosticate, with any degree of reliability, what the range of prices will be. The new year will commence with Australian coal for shipment at a cost, landed here, duty paid, of \$7.12½, English coals at say \$7.25, but for what period these prices will be maintained depends so much on our new wheat crop, the demand for tonnage in other countries, the condition of European grain markets, and other contingencies, that an attempt to prophesy would be the merest guesswork.

Underlined is a comparative statement of the imports of coal into this port only. The imports of coke were 35,150 tons.

The deliveries of coal at San Pedro and San Diego were about 125,000 tons, 75,000 at San Pedro and 50,000 at San Diego.

	Tons	Tons
Australian.....	1801	1890
Great Britain.....	230,370	153,390
Eastern.....	183,790	38,570
British Columbia.....	36,450	23,700
Port of Seattle.....	466,770	329,640
Port of Tacoma.....	218,700	218,700
Other mines.....	19,400	153,070
Totals.....	63,800	71,050
Totals.....	1,400,220	1,018,120

A Peruvian Reduction Process.

One of the most frequent of obstinate ores met with in Peruvian mining is blende, containing sulphate of zinc, which has hitherto baffled all known methods of reducing. The inventor of a new process, Sr. Don Pedro Felix Remy of Lima, has, we are informed on good authority, recently demonstrated before a competent assembly of experts in that city his discovery, which possesses almost the same importance as the system of amalgamation discovered by Medina in 1557, which enabled America to supply the world with its treasures in gold and silver. The reduction is accomplished by means of a reactive which the inventor has not yet disclosed, but the mechanical part of the operation is conducted in the following way: The ore is reduced to a powder by means of stamps; it is then calcined in a furnace, where the sulphates and antimony are volatilized. It is then placed in a barrel mixed with the reactive; small quantities of iron and quicksilver are then added. It is then rotated for a space of eight or ten hours. The quicksilver having become amalgamated with the silver, is taken out and filtered through chamola leather and the gangue separated. The silver is then reheated and cast into bars. In the last trial, 427 grams of silver were extracted from 350 kilos of ore, or 99 per cent of the silver contained. There was no appreciable loss of the mercury. The estimated cost of refining by this method is 23 sols, or £3 9s. per cajon of 3 tons, or £1 3s. per ton of ore. No further recommendation of its advantage is therefore required. This discovery will, it is expected, prove of immense value to Peru and greatly benefit the mining industry, and it may be mentioned that the great Orahuacra vein in the Yauli province, which is reckoned the third richest in the world, is chiefly composed of this ore, containing 20 marcos of silver and 10 per cent of zinc.—*London Mining Journal*.

ORDNANCE FOR THE MONTEREY.—In the Ordnance Bureau it is learned that the turret armor for the Monterey is ready for shipment to San Francisco at any time. Her great guns are also ready, and the Pennsylvania Railway has undertaken to transport them across the continent. The task is one of magnitude, as a 12-inch rifle without carriage weighs 56 tons and the carriage weighs 25 tons. Specially constructed cars will be necessary for the transportation of these great masses of metal, and much nice calculation respecting curves, tunnels and strength of many bridges between

the Washington and California Navy-yards have been made to insure the safe delivery of the guns. These guns are not only intrinsically valuable, but their loss at the present time would be a serious calamity, as many months would be consumed in making guns to replace them.

A Great San Diego Enterprise.

The opening of the Linda Vista and Otay Irrigation Districts in San Diego county has been brought about by the development of the Mt. Teocote Water System, by which 100,000 acres of these mesa lands, extending from the Sweetwater river on the north to the Mexican border line on the south, are to be reclaimed.

Leu B. Harris, Jr., the mining engineer, gives the *Chronicle* the following particulars of the great work done in the neighborhood of these districts:

"It was thought impossible to float the mesa lands until within a few years back, when it was found by a party of investigators, of which I was one, that the Cottonwood river might be diverted from its course through Lower California, and made to cover over 100,000 acres. Surveys proved that the water of the Cottonwood could be brought through Dalzura Pass, distant 30 miles from San Diego to Jamul valley, and thence by way of Janal Meca into San Diego itself, if necessary. This led to the planning out of the Mount Teocote system.

"The pioneers were: J. F. Sinks, Vice-President of the San Diego Bank of Commerce; J. W. Young, H. P. Whitney, G. H. Mulfield, D. D. Maynard, T. E. Pope, S. J. Sleh, and several others. Surveys were projected and work commenced four years ago. Cottonwood river has a summer depth of 18 inches, and in winter runs a torrent.

"A cut has been made through Dalzura Pass, 1000 feet long and 20 feet deep. Another important work is now being done, and within a year or so the great undertaking will be completed."

At the junction of Pine Valley and Cottonwood creeks a dam will be constructed 100 feet high and 450 feet on the crest. A reservoir covering 800 acres, and containing 6,000,000 gallons, is to be built. The cement used is obtained at Jamul at a comparatively trifling cost. From the dam a flume, 15 miles long, will extend to Jamul creek, terminating at Dalzura Pass, where an elevation of 1450 feet is reached. The flume will cost at the rate of \$10,000 a mile. At Dalzura the water will be diverted into ditches, and conveyed over three districts (including Otay and Linda Vista) of a total acreage of 95,000, with a reserve capacity of many thousands more. But the marvelous usefulness of the almost exhaustless system does not end here. At the west terminus of the Otay mesa the branching waters leap over a chasm of 300 feet, developing a horse-power of 1500, which may be used to operate factories or electric dynamo. The system in its totality also includes the supplying of San Diego with drinking water.

The total cost of the work will be \$1,000,000, and the recently formed district will vote bonds sufficient to cover this sum.

The "River Convention."

The California River Improvement Convention will be called together in Sacramento at 2 o'clock on Friday afternoon, the 15th inst. Through the action of this Convention of 1890, the Board of Engineers and the Engineer Department have recommended for the next fiscal year appropriations aggregating \$720,000 for the improvement of California rivers. The Convention will have to urge these appropriations before Congress and to see that no scaling down is done.

The following letter has been sent to the Boards of Supervisors of Shasta, Tehama, Colusa, Glenn, Butte, Sutter, Yuba, Yolo, Solano, Sacramento, Placer, San Joaquin, Contra Costa, Merced, Fresno, Stanislaus, Sonoma and San Francisco counties, and also to the Board of Trade, Chamber of Commerce and Produce Exchange of this city and to the Sacramento Board of Trade:

GENTLEMEN—I am directed by Hon. P. E. Platt, Chairman of the California River Improvement Convention, to request you to select and notify at least ten (10) delegates to this Convention, five (5) of these being in addition to the present members. These delegates are to meet in Sacramento, at 2 o'clock in the afternoon, on Friday, January 15, 1892.

It is unnecessary to more than call the attention of your honorable body to the need of appointing active and influential men, who will personally interest themselves in securing governmental aid in the vast work of improving, protecting and extending internal navigation.

This Convention will formulate and press measures to secure the appropriations recommended by the Board of Engineers appointed through the Convention of 1890. There has been recommended for California rivers the sum of \$720,000 for the next fiscal year. Every dollar of this sum should be appropriated. Very respectfully,

MARSDEN MANSON,
Secretary Executive Committee.

MARINE ENGINEERS.—The Marine Engineers' Association has elected the following officers to serve the ensuing term: Pres., F. A. Jones; Vice-Pres., Richard Tomlin; Treas., A. McDonald; Sec'y, S. True; Financial Sec'y, W. D. Nelson. Trustee—W. K. Martland, Chas. C. Lacey, Jas. S. Richards, F. Gough, Jas. E. Keller.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLINTON CONSOLIDATED.—*Leider*, Jan. 2: This mine was closed down for a day or two after the cold snap of last week, on account of the water in the ditch being frozen. The chlorination works came to a standstill Saturday, on account of the exhaustion of the stock of sulphurets. About 150 tons were treated. What they yielded we are unable to say. The percentage of silver is much heavier than is usually the case with the gold-bearing quartz of this county. We are told the sulphurets yielded over \$8 in silver to the ton. Some very rich ore is being extracted from the mine.

A **CLEANUP** was made at the Amador Queen mill Saturday, since which time the mill has been idle.

MARBLE.—The Carrara Marble Quarry Co. has levied Assessment No. 3 of two cents per share. It must not be inferred from this that the operations have not been remunerative. A certain amount of stock was subscribed to provide working capital to the extent of 15 cents per share. Even with the present assessment, only six cents of this sum has been called in. The stock thus subscribed for is supposed to bear all the running expenses of the company, until the full amount of 15 cents has been paid, leaving the proceeds of the sale of marble, as we understand it, untouched in the treasury, and available for dividends, or to meet the current expenses after the exhaustion of the 15 cents as above stated.

FROM SUTTER CREEK.—At the Belmont, two shifts are kept at work in the Boss shaft, which is now timbered and cleaned out down to the 70-foot level. The facilities are hardly sufficient to cope with the strong flow of water. They talk, however, of putting in machinery in the near future, which will enable them to handle all the water that is likely to be encountered. The vein is explored at this level the full width of the shaft and prospects well enough for milling purposes. The mill has been put in good repair, and will be started on ore in the early part of January. The Lincoln is still running along in the old way, and gradually improving. At the South Eureka the shaft is now down over 300 feet. The ground is somewhat harder, so that progress is slower.

FROM VOLCANO.—Cor. Amador *Dispatch*, Jan. 2: Work on the McLaughlin mine is progressing nicely under the skillful management of Supt. Beardsley. The Robinson boys are still working their mine with flattering prospects. The Kimball mine, on Pioneer creek, known as the Old Dead Sheep, is yielding some of the finest rock we have seen. The ledge is still widening, and the consequence is Mr. Kimball is jubilant. Jake Griesbach has also struck rich ore. Josh Goodrich, Superintendent of the Buckeye and old Volcano ditch, has men at work cleaning out the ditch.

Butte.

SIX THOUSAND MORE.—Oroville *Mercury*, Jan. 2: Yesterday E. B. Ward came down from the Pershaker or Rideout mine and brought 313 ounces of gold, the result of about 2½ days' cleanup. The first day they took out 216½ ounces, the second day, and the balance was picked up from waste places. In cleaning up, the miners literally scooped up the nuggets in handfuls. While the above is true, the mine was suddenly closed on Thursday, presumably for the purpose of making shafts and changing the method of working.

Calaveras.

PROSPECTING FOR GRAVEL.—*Calaveras Chronicle*, Jan. 2: George Edwards and Dan Danielson, two energetic, industrious young men, and practical miners, ton, have been at work for a short time, running an incline to strike and explore a branch of the "Blue Lead Channel," in Old Woman's Gulch, Danielson having purchased the one-third interest of John Williams in the location. It will not necessitate extensive operations to bottom the ground, as the indications already apprise the prospectors that they are upon the blue gravel deposit and about to penetrate it. They will continue their operations until satisfied of the extent and auriferous character of the deposit on their location. For a while a horse and whim will be used for drawing out the dirt.

SILVER ORE.—*Calaveras Citizen*, Jan. 2: Old Calaveras leads any other county in the State in the variety of its mineral products; while much attention has been given to gold, copper and other metals, it is right to let the heavy deposits of silver ore, situated north and west of Salt Spring valley and only about 7 or 8 miles from Milton, lie undeveloped. We were shown very rich specimens of silver ore by School Supt. Nunez this week. The rock was taken from the Reckley mine, which has lately been bonded by Cleveland & Donner.

El Dorado.

BLAIRS DISTRICT.—Cor. *Mountain Democrat* Jan. 2: Work on the machinery at the Blair mine has been progressing rapidly, and in the course of a week or so, the compressor will be ready for operation.

CHANGE OF MANAGEMENT.—*Mountain Democrat*, Jan. 2: Prof. Thos. Price, general manager, Richard Rowland, Supt., and Thos. Evans, general agent, have resigned the management of the Sierra Nevada Land, Water and Improvement Co. These gentlemen, upon retiring from the management of this grand property with its untold resources, which they have so ably conducted for several years, congratulate themselves upon the fact that it is now in better condition than ever before, and that it has been so far explored and developed, and with reasonable skill, energy and economy in its management, it can be made almost immediately available for the production of gold in large quantities and to great profit. The system of ditches belonging to the company are all in complete order, several new flumes having been constructed during the past year. The electric light plant, now supplying the city with light, is running regularly with water-power. The city water works, owned by the company, have also been put in complete order. At the Harmon mine, where a very skillful piece of engineering has been done by John Price, civil engineer, an upraise has been made and substantially timbered from the long tunnel below to the surface, through good ore, giving 560 feet of backs, now ready to be taken out and

run in the mill. At the Van Hooker a long tunnel has been run, and in a few days can be completed to a rich ore chute known to exist in that mine. The Epley mine has been so far developed as to show several thousand tons of ore available for immediate working. The Pacific shaft has been sunk to a depth of 1000 feet, showing a continuous gold-bearing vein from top to bottom. Arthur Young succeeds to the management of this property. Prof. Price is the owner of a one-fifth undivided interest in this large property, and hopes now that after so many years of toil and expenditure of money on making developments, he may begin to realize.

Inyo.

IMPROVEMENTS.—*Inyo Independent*, Jan. 2: Hon. P. Reddy is making extensive improvements at the Defiance and Independence mines. He recently paid Jack Wilson \$5000 for Wilson's interest in the Independence. In the latter mine there is a large amount of ore in sight, but owing to dust miners are unable to work long without getting sick. To obviate the trouble, water for sprinkling will be pumped from the Defiance dump to the Independence, a distance of three-fourths of a mile and a raise of about 450 feet. The necessary pumps, pipes, etc., are now on the ground.

Lake.

PINE FLAT DISTRICT.—*Santa Rosa Republican*, Dec. 29: There are immense lodges or ledges traversing the slate crop high above the surface or running through the mountain ridges. These continue into Lake county, and just beyond the line of Sonoma county a few miles we find such mines as the Great Western, Bradford and Napa Consolidated, all located on the belt of ledges found at Pine Flat. The prospecting done years ago, in the vicinity of Pine Flat, was of the most superficial character, and it was left to a later and more experienced class of miners to begin the development of a district destined to become famous as a quicksilver producer. There is at present considerable prospecting and development of the mines going on in the above mentioned district, and some permanent mines have undoubtedly been discovered. The Cinnabar King Mining Co. ran a tunnel into the ground 100 feet, passing through a body of ore 30 feet thick, and is now working day and night extending the tunnel toward the other two chutes which appear on the surface or near the surface. This company is also sinking to cut the air chutes lower down. This will give 500 feet of backing. There is an abundance of good ore in sight, and the outlook is a most favorable one. In the same locality, and on the same ore-bearing belt, is the Last Chance. The owners have a good body of ore. A shaft is being sunk. The American is another good mine in prospect. They have good hunches of ore, and very favorable indications when depth is reached. The Oakland, near by, has been a good paying mine, but has been idle for some years. The Excelsior mine is also making developments, which at the present writing are promising. Other smaller mines are being prospected or developed, and the general outlook is very promising.

Mono.

THE YEAR'S WORK.—*Bodie Chronicle-Union*, Jan. 2: The past year has witnessed more substantial prospecting in mining interests in Mono county than has been done for many years past, and with a success that promises a lively mining "boom" for the county next spring. In every district there are mines that promise to be bullion producers next summer. Among these are, notably, the Lakeview. This mine is in the Homer district, near Lundy, and about 20 miles from Bridgeport. A large body of gold ore has been disclosed, which is being worked in one of the small local mills. As it belongs to a close corporation of Maine men, the shipments of bullion are not given to the world, but it is sufficient to know that the mine has shown a value that has induced the owners, who are all shrewd business men, to erect a mill at the mine for the more expeditious working of the ores, which seem to be unlimited in quantity. The mill building is completed, and a large and substantial edifice it is, and everything is ready for the setting of the machinery, but which will not be put in until early in the spring, when a month or six week's work will place the mill—a ten-stamper—in fine working order. The tramway for transporting the ore from the mine to the mill is in fine working order, and as the mill will be run by water power, the cost of the working of the Lakeview ores will be very low, leaving a grand profit to the fortunate owners. There are many other valuable mines in the Homer district, and adjacent to the Lakeview, which are being steadily worked by their owners, who now and then ship a little bullion to the outside world, which enables them to work their mines and live well, and leave some over for a rainy day, knowing the time will come when capital will want their mines at a fair valuation.

BODIE.—The working the Bodie mines goes steadily on, the old reliable Standard Co. making its regular monthly shipments of bullion. The "unpleasantness" so long existing between the Bulwer Con. and Standard Con., and which was a detriment to both corporations and the district, has been settled, and the Bulwer will soon have a mill running on the rich ore so long in dispute. The Standard has declared a dividend of 10 cents a share.

BENTON.—The mines about Benton are being worked quietly and profitably, most of the ore being shipped to the Selby works at Vallejo Junction for reduction, at a freightage of about \$3 a ton.

GREEN CREEK.—This district, contiguous to Bridgeport, will make a good name for itself next summer. The Ward & Ryan claim has been opened sufficiently to warrant the erection of an arrastre, or small mill, the rock showing free gold, of which there seems to be an abundance. Other claims, which are looking well, will be prospected vigorously next summer.

PATTERSON DISTRICT.—More substantial, intelligent mining has been done in this district this year than for some years back. There are several claims that will be worthy the attention of capitalists next summer. Among the promising are the Home-stake, Kentucky, Lookout, Monte Cristo, the Murphy claim, and Rattler, upon which the most work has been done. It takes money to open a mine to a paying proposition, and that is the only item lacking in making the Patterson district, Mono county, a grand bullion producer. The prospects of the county, from its extreme northern boundary to its southern, for even Antelope valley on the north

has pretensions to having good mining prospects, were never so flattering as at this time, and our people confidently look for the coming year to be a busy and prosperous one for Mono county.

Nevada.

TO BE INCORPORATED.—*Grass Valley Telegraph*, Dec. 29: Steps will be immediately taken to incorporate the Cottontail mine, located in the vicinity of Rough and Ready. The principal owners are Oscar Patterson, Jas. Stead, Josiah Andrews and John Williams of Grass Valley, and Wm. Torpie of Rough and Ready. Several weeks since some rich specimen ore was taken from the Cotton-tail at a comparatively superficial depth.

Plumas.

IN INDIAN VALLEY.—Cor. *Plumas Bulletin*, Dec. 30: The outlook in Indian Valley district has never been better than at present. The Drury-Pacific mine, owned by Messrs. McGill & Standart, situated in North canyon and near Round Valley reservoir, since May last has added over \$23,000 to the world's wealth, representing the proceeds of 3000 tons of ore milled. Extensive development work, including air drifts, raises, etc., prevented milling till late in the season. The mine now shows reserves above the present working level sufficient to provide three years' crushing for their fine 20-stamp mill located on the property.

JOHNNY BULL.—Deep in the depths of North canyon and below the Drury, this mine is situated. The owners have equipped a five-stamp mill from its proceeds, and have been running for most of the season on profitable ore.

ACADIA.—A large amount of money was taken out of the upper workings some years ago. A new tunnel has recently been started to tap the vein lower down. The 10-stamp water mill upon this mine is the property of D. McIntyre and is frequently employed in crushing custom ore.

PLUMAS CONSOLIDATED M. & M. Co.—Disagreements with the water company over rates for water caused the owners of this mine to close down its machinery two years ago. Several men have since been kept at development work and they are known to have revealed rich ore in abundance.

CRESCENT MINE.—For eight months past the work of sinking to obtain an additional 200 foot level of this mine, has been in progress. The shaft was recently completed, and the work of running both the north and south drifts for the purpose of tapping the vein, is now under way. Additional and permanent pumps have been placed in position in the mine.

GREEN MOUNTAIN.—The plant consists of one of the finest and most expensive 60 stamp mills in the State, together with air compressor, drills, &c., and all modern appliances for mining and handling ore economically. Power is obtained from water supplied to Pelton wheels by the Round Valley Water Co., under pressure of 500 feet vertical fall. The adjoining claims, embracing what was formerly called the Cherokee mine, are now consolidated with the original Green Mountain property, forming a chain of continuous locations, many thousand feet in length. The main tunnel will be driven ahead to connect the two properties. This tunnel is now nearly 600 feet into the mountain, over 1000 feet below the surface croppings. By an extensive system of cross-cutting to be employed, the numerous parallel veins known to exist but never heretofore sought for by this method, will be thoroughly prospected.

BUTTERFLY MINE.—*Plumas National*, Jan. 2: S. S. Williams informs us that the owners of the Butterfly quartz mine are now working in the shaft, which is down 50 feet and ore was taken out of the bottom this week that was very rich. This will undoubtedly prove a very good mine, when once developed. It is owned by Thompson, Kellogg & Smith.

SWAN.—Hubbard & Waldren, who are working the Swan ledge at Granite Basin, are taking out some rich ore. The east tunnel is now in 250 feet, and the west end 200 feet, leaving about 400 feet to connect the two tunnels. A five-stamp mill is now on this property, but Mr. Hubbard tells us in the spring he will try the McArthur and Forest process, and if it proves a success, a large plant will be put up.

SALE.—Pat Maloy has made a sale of his mining property on Willow Creek, some three miles from Buck's Ranch, to a Virginia City company. A 10-stamp mill will be put up in the spring. The rock is very rich, prospecting \$65 to the ton. Ed. Fields is running a tunnel south of town for a rich channel. He has great faith that he will strike it, for he says he knows the gold is there. The Golden Gate Co. have about finished cleaning out the old tunnel run by Barrett & Co. a few years ago. They will extend this tunnel, and expect to strike the ledge in running a hundred feet or so.

Shasta.

TELLURIUM.—*Redding Free Press*, Jan. 2: At the annual meeting of the Eureka Tellurium M. Co., the following directors and officers were elected: Directors—Peter Scherer, Isaac Atwood, F. B. Simonds, E. A. Zoellin and Philip Scherer. Peter Scherer was elected president, Isaac Atwood vice-president, George C. Jones secretary, and the Bank of Shasta County treasurer; Peter Scherer general manager.

Sonoma.

GREAT EASTERN.—Cor. *Santa Rosa Republican*, Dec. 29: The Great Eastern mine near Guerneville, which has been worked the past 16 years, has about 100 men employed, and with the aid of three ten-ton furnaces, 150 flasks of quicksilver are produced monthly.

San Bernardino.

CEMENT.—*Redlands Facts*, Jan. 1: The contracts between the Los Angeles Portland Cement Co. and the Pacific Improvement Co. have been signed, and by June 1, 1892, a plant costing \$50,000 will be erected on Slover mountain. The company will make 100 barrels of cement per day for 18 months and 300 barrels a day for the balance of five years. When running to full capacity, the works will give employment to 400 men. The company has a capital stock of \$500,000.

NEVADA.

Highland District.

GEORGIA.—*Pioche Record*, Jan. 2: Henry Welland and J. H. Empey have struck a body of ore in the Georgia mine at Highland, this week, which will undoubtedly prove an important find. A tun-

nel has been run into the hill about 30 feet on a small streak of ore. In driving this, the miners encountered a cave or fissure filled with ore and of great extent. One of the men crawled into the fissure 15 or 20 feet and obtained samples of the ore, which is very easy to extract, and goes 39.33 ounces silver and 60 per cent lead. As this find is developed, we will have more to say concerning it.

Jackrabbit District.

ORE BODIES.—*Pioche Record*, Jan. 2: Three new bodies of ore have been discovered in the Day mine within the last few days. The location of the principal find is about 70 feet south of the shaft and 20 feet above the tunnel level. The ore assays from 40 to 200 ounces silver per ton, and Mr. Hazlegrove says that the whole body, so far as prospected, will go over 40 ounces. The extent of this ore body cannot yet be ascertained, but enough has been done to prove that it is very large. The other finds are smaller, but are of a good grade of ore, and will probably yield several thousand dollars before they are exhausted.

Tuscarora District.

NORTH BELLE ISLE.—*Times-Review*, Jan. 2: No. 3 north drift, 400 level, extended 5 feet. No. 4 north drift, 500-foot level, extended 13 feet, again cutting the vein. Crosscut from No. 2 raise, north end, extended 7 feet, passing through several stringers of good ore. The winze below intermediate crosscut sunk 7 feet, exposing a strong vein with very rich ore. There is no doubt but that this vein is the No. 1 vein of the Belle Isle that has yielded so largely in the past. The stopes are yielding as usual and employing about 10 men.

NAVajo.—North intermediate drift below 350-foot extended 4 feet, yielding some good ore. No. 2 winze below 350-foot level sunk 4 feet on a small vein of very rich ore. The stopes are yielding as usual, but we have been unable to ship any ore, owing to continuous snowstorms.

BELLE ISLE.—Have started an intermediate drift north from the winze below the 350-foot level, No. 2 vein, and the face is showing very fine ore. Stopes on Nos. 2 and 3 veins are producing as usual.

DEL MONTE.—2d level—Joint drift has been advanced to feet, exposing ore along the line 45 feet. Have started to open stopes on this ore.

NORTH COMMONWEALTH.—Second level—Stopes north from the winze do not look so well as last reported. On the south and east of winze still showing very high-grade ore. Have started winze from west drift to follow the ore down; extracted 66 cars of ore.

COMMONWEALTH.—Fourth level—South drift from No. 2 raise has been advanced 8 feet in the line, and joint raise started; should reach the vein in about 25 feet.

NEVADA QUEEN.—Second level—No. 1 south drift has been advanced 15 feet. No. 2 south drift has small seam of ore in the bottom, giving assays \$234 per ton. Fourth level—West crosscut following the vein has been extended 14 feet, with spar showing iron pyrites in the seams. A joint raise has been started on the line to cut the vein.

Washoe District.

CON. CALIFORNIA & VIRGINIA.—*Virginia Enterprise*, Jan. 2: 1100 level—From the end of the drift run south from the main north lateral drift, an east crosscut has been advanced 30 feet in a quartz formation carrying low assay value. Have extracted a few tons of milling ore from between the east crosscuts Nos. 4 and 5. 1500 level—The incline upraise has been carried up 25 feet; total, 80 feet; following the ore streak, which has narrowed and become of poor quality, and has been stopped. 1600 level—The various openings on this level continue to yield some ore. 1650 level—Have continued to extract ore of fair quality from the drift run west from the top of the upraise carried up 59 feet above the south-west drift. 1750 level—In working out and upward from the bottom of winze No. 2, sunk from the 1650 level, we continue to extract ore of fair quality. Have also extracted some milling ore at the point where the upraise carried up from the crosscut run west from the southwest drift made connection with the stopes on the eighth floor. There has been extracted from all parts of the mine during the week 1029 1350-2000 tons of ore, which was shipped to the Morgan plant. The average assay value of all the ore worked at that mill during the week (980 tons) was \$22.36 per ton. Bullion shipped to Carson mint, assay value, \$27,770.02. Bullion shipped to the office in San Francisco, assay value, \$1960.01.

OPHIR.—1465 level—Have continued our prospecting work in the openings leading from the point where the upraise from the sill floor of this level connected with the drift run west from the winze 122 feet below the sill floor of the 1300 level, and have extracted some ore, which has not yet been raised to the surface.

MEXICAN.—On the 1465 level the winze started at the end of the crosscut run west from the north lateral drift at a point near the south boundary line of the mine, 132 feet in, has been sunk 6 feet; total depth, 101 feet. From the bottom of this winze a west crosscut has been started.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. west drift from the shaft has been extended during the week 31 feet; total distance west of the shaft, 1595 feet; the last 20 feet has been in vein matter yielding low assays.

UTAH.—750 level—At a point 50 feet south from the winze station, west crosscut No. 1 has been advanced 37 feet; total length, 172 feet, continuing in porphyry formation, showing some clay and a little water.

GOULD & CURRY.—North drift, 65 feet above 200 level, is advanced 165 feet. From the end of this drift started west crosscut No. 3, and advanced same 10 feet through quartz.

OCCIDENTAL.—The upraise from west crosscut from the south drift has made connection with the south drift on the 300 level. The winze from north drift, 350 level, is now down 53 feet below the 400 level, and continues in fine grade ore.

BEST & BELCHER.—900 level—At a point 100 feet above 1000 level, in upraise No. 1, started a northwest drift, and advanced same 20 feet through hard porphyry and stringers of quartz.

CHOLLAR.—Have resumed work in the north drift from the incline station, 1500 level; the face is in hard porphyry. Extracted and sent to the mill in the past week 368 tons of ore; average battery assays, \$38.91.

POTOSI.—The south drift from top of raise, 1200 level, is out 41 feet; face in quartz yielding fair assays. The east crosscut from the winze station, 1400

level, is out 56 feet; face in porphyry. Have connected the south drift from Chollar incline with north drift from Potosi winze on 1500 level.

EXCISEQUER.—East crosscut, 150 feet north of north line, 600 level, is out 200 feet; face in porphyry.

SIERRA NEVADA.—West crosscut No. 1 from the northwest drift, 630 level, 571 feet from the shaft, has been advanced 37 feet; total distance, 1535 feet; face in porphyry.

ALPHA.—The east crosscut south of the winze, 550 level, is out 39 feet; face in quartz and porphyry yielding low assays. The north drift from the winze 80 feet north of the shaft, 500 level, is out 129 feet; face in clay and quartz.

WARD COMBINATION SHAFT.—The southwest drift, 1800 level, is out from shaft 907 feet, the last 10 feet in clay and quartz.

SILVER HILL.—During the week shut down the Silver Hill shaft and are preparing to work the mine from the Justice shaft.

NEW YORK.—West crosscut No. 4, 650 level, is out 58 feet; formation quartz. The east crosscut, 740 feet north of the shaft, 1100 level, is out 58 feet; face in quartz and porphyry.

ARIZONA.

MOHAVE CO. NOTES.—*Miner*, Jan. 2: It is reported that both of the mining companies that have been operating in Weaver and Minnesota districts have suspended. No reason is assigned, but it is presumed to be on account of the failure of the water power wheels to run the quartz mills. Every one who has visited the districts pronounce the supply of ore practically inexhaustible, and as there has been no millrun made, the suspension cannot be attributed to the grade or baseness of the ore. The hoisting works on the Distaff mine at Chloride was burned to the ground Wednesday night. The building was a total loss, but fortunately the machinery is but slightly injured. Operations on the mine and mill at Gold Basin have again suspended. This time it is alleged that the shutdown is caused by the freezing of the water in the pipe line, which had the effect of bursting the pipes in a number of places. Of course, this shut off the supply of water for the mill, but it is a to-be-regretted fact that it was deemed necessary to close down the mine, pending the repairing of the pipes.

COCHISE DISTRICT.—*Tomestone Epitaph*, Jan. 2: Three carloads of ore were shipped from Dragon station on Tuesday last to Pinos Altos mill. The ore was from the Golden Rule mine, which is coming rapidly to the front as one of Cochise county's big producers. From Jimmy Barrett, who came in from there on Thursday, the *Prospector* learns that the storage reservoir, which is to hold water for the mill to be erected, has been completed. The size of a lake, when full, will be one mile long, 70 feet wide and an average of 30 feet deep. The dam is one mile below the mine. This will be one of the first attempts at water storage chronicled in Cochise county. Mr. Bell, who is the owner of the mine, looks upon the work as experimental, but hopes for the best, and if the reservoir holds the water, he will place one of his largest mills, of which he has several, on the property. The extension of the mine belongs to Barrett. He has leased one divided half of it to Thomas Trainor, who will begin work at once. Besides the gold ore, which is considered the most valuable, this district also contains some first-class smelting ores, that are being looked after by smelting men. Taken all together, the outlook for this district is a most auspicious one.

BRITISH COLUMBIA.

MACHINERY TO BE PLACED ON THE DANDY.—*Nelson Miner*, Dec. 29: Enough is now known of the size and character of the ledge on the Dandy to warrant its owners placing machinery on the property. With that end in view, the working force has been reduced, Superintendent Ray leaving Nelson for Wardner, Idaho, yesterday. It is understood that an electric plant will be put in early in the spring, as electric machinery is now in successful operation in the Poorman and Black Bear, two well-known Cœur d'Alene mines. Manager Esler is to be congratulated on adding another mine to the list of those successfully operated by his backers. Since beginning operations at the Dandy in May last, Superintendent Ray has run nearly 500 feet of tunnels and drifts—pretty good work for the number of men employed. William Springer, the well-known miner, is now in charge of operations at the mine.

TUNNEL ON THE EVENING.—The tunnel on the Evening is in 160 feet, with two men at work on a contract. The contractors expect to receive word from the owners of the property (Spokane parties) to crosscut the ledge, the tunnel being run on the hanging wall. The snow is reported less than three feet deep at the mine, which is distant about three miles westerly from the Silver King.

COLORADO.

SMELTING ORE.—*Mining Gazette*, Jan. 2: The Hubert company is sinking a winze and making an upraise to connect the 850 and 900 foot west levels, and are employing a force of 25 miners. The smelting ore nets from \$90 to \$180 per ton. The stamp mill dirt yields from four to ten ounces of gold per cord.

STRIKE.—A strike of considerable importance has been made on the Mary Ann lode, on the western slope of Argentine pass, during the past week. The property is owned by J. P. Ward. During the past few months he has had a crosscut driven to the lode and recently let a contract to run a drift. A little mineral was showing at the start, and during the past week it has opened into a solid vein of high-grade ore.

THE LITTLE ALBERT resumed work this week. The company's secretary, J. E. Lawton, has been in the city the past week and has paid up all accounts against the company. Lou Harvey, the old superintendent, has been reengaged and has hired a force of men and put them to work. This mine has a good reputation in this district as a profitable producer from the day of its discovery, and everyone will be pleased to hear that the company has decided to resume operations.

PROSPECTING WITH A DRILL.—*Pitkin Miner*, Dec. 29: The Diamond drill now being placed in Chicago park by the Pitkin Mining Co., is destined to revolutionize the past mode of prospecting for mineral in the Lime belt contiguous to Pitkin. This

drill is a Sullivan Diamond Core drill, with a capacity of boring 2000 feet and taking out a perfect core of the formation to that depth, of 1 3/4 inches in diameter. The machinery consists of a 25-horse power boiler and double cylinder engine with double duplex pumps, also drills, drill rods, casing and a complete outfit of the latest improved pattern. The Pitkin Mining Co.'s property consists of 22 lode claims, comprising nearly 230 acres, mostly in and around Chicago park in the center of the mineral belt, forming a basin which is surrounded by the best shipping mines in the district. The formation is lime and porphyry, which pitches or dips toward this basin. The Pitkin Mining Co. is a local organization. Mr. W. L. Youle is the efficient superintendent in charge. The drill is now being placed over the Ferry shaft at the lower end of the park. This shaft is already sunk to a depth of 100 feet, having passed through the overlying porphyry and encountered the lime. It is estimated that it will not take to exceed 400 feet farther to prove up the contact in the lime at this point. The conservative miners of the camp all concede without a doubt that this drill will prove up immense ore bodies in Chicago park.

DAKOTA.

GALENA.—*Deadwood Pioneer*, Jan. 5: At this camp there are at present only four mines being worked, the Bullion, Cora, Hayes and Silver Queen. The Bullion is producing some good grade ore, averaging about 50 ounces in silver. Lead carbonates are found in large bodies in the Hayes and Silver Queen. The former is shipping to the D. & D. smelter in this city, while the latter is stacking its ore on the dump, awaiting increased facilities for shipping.

ANNIE AND OPHIR.—*Deadwood Pioneer*, Jan. 2: A description of one gives a good idea of the other of these claims. They are both evidently on the same contact. A rim or fringe of ore was found in the hillside, starting in a seam about five feet thick, which carries free gold of a low grade. As depth was attained in the workings, the dip was found to be sharper, and the mass of ore larger and of better quality. Some small quantities of very good ore found from the start deceived the first owners as to the average. Experimental mill tests were made, and the average found too low for profit, though it was high enough to be very profitable, had there been been very large quantities of it, so as to warrant a very large mill. Upon the Annie, very extensive workings have been opened, by a main tunnel several hundred feet long, in which heavy masses of ore have at last been struck, with indications that they are extensive. Tests indicate that it will average \$4 per ton. In this mine and other deep works in that vicinity, are exposed what seem immense bodies of what some miners call pudding stone, which is valuable as a free gold ore in proportion to the amount of iron in it. The mass seems to be a mixture of all the different rocks of the vicinity, churned into one mass, and great hopes are still entertained of finding the mother lode whence came the valuable mineral. The Annie mine is the largest mass so far opened.

IDAHO.

A GENERAL SHUT-DOWN.—*Butte Inter-Mountain*, Dec. 23:—News has reached the city that the Poorman mine, in the Cœur d'Alene, has closed down for the winter, and that about 60 miners have purchased tickets for Butte. The news of the shutdown is not surprising, and it is very likely that all the mines in Canyon and Prichard creeks will suspend operations. This is the result of a determination made a year ago. At the Poorman mine, the company has not made any money during the months of January and February since it has been in operation, and sometimes in the month of March. Instead, during these months, the expense of running has increased and the mine gutted out; added to this were the annoying delays of freight on the railroad caused by snow blockades, and on top of all this is high freight rates. The Cœur d'Alene companies want a reduction of \$2 per ton on the freight rate. If this were granted, they could continue mining at a small profit during the winter, but it has not been granted, and the result is the railroad company is likely to be deprived of any business in that section for the next two or three months. Several months ago, the different companies agreed to close down unless the reduction was made, but it will probably be only for the months of January and February.

MONTANA.

BARKER.—*Helena Mining Journal*, Dec. 30: After thoroughly testing the ore of the Carter at various smelters through the country the owners of the mine have decided that they can save money by concentrating their ore at the mine. They have accordingly ordered machinery for a plant capable of treating 50 tons daily. They have also ordered a hoisting plant and will sink the double compartment shaft 300 feet. This will give them sufficient ore for several years. It is learned that Senator T. C. Power intends putting up a concentrator at the Wright & Edwards.

BELT MOUNTAIN MINES.—A visit to the old Wright & Edwards mine discloses the fact that since operations were resumed rapid progress has been made. The shaft house will also be used for the hoist. On the lower side are substantial ore bins, having a capacity of 200 tons. These bins are arranged so that the ore may be dumped directly into the wagons. The machinery consists of a 40-horse Griffith engine and two 30-horse boilers. Development on the mine consists of a shaft down 180 feet and a tunnel in 676 feet. This work was done early in the 80's when Barker was the liveliest camp in the West. The shaft was sunk on ore all the way and there is now exposed in the bottom a vein of solid galena six feet wide. The tunnel was driven through ore and lead matter and there is still much good stopping ground. Mr. Cowan, superintendent of the mine, has cleaned out the old workings, repaired the timbers, and is now ready to commence taking out ore. Common report has it that the Wright & Edwards are the two best properties so far known in the Barker district. Their developments promise much for the future prosperity of Barker.

ANACONDA.—*Butte Inter-Mountain*, Jan. 2: It is understood that the Anaconda Company has sent

a force of men out to work at Three Forks, for the purpose of making ditches with a view to creating a big water power there. Whether this is the preliminary step toward the building of the much talked of refinery or not is not known, but it is so considered. At the smelting works at Anaconda, the capacity of the electrolytic refinery plant is being doubled.

WITH A DIAMOND DRILL.—*Phillipsburg Mail*, Jan. 2: The stride in the Jubilee tunnel, which was reported in the *Mail* two weeks ago, has assumed greater magnitude than any one connected with the mine had anticipated. The strike was made at a distance of nearly 1300 feet in the tunnel, and at a perpendicular depth of about 200 feet. There is now 14 feet of rich ore in sight, and the footwall is not yet encountered. Large quantities of the ore is being taken out and hauled to the mill, which, it is said, will start up about the middle of January. From every appearance of the find in the Jubilee, it bids fair to outlive any previous discovery in the Hope company's ground, they are pretty sure to enjoy another season of great prosperity. Of the mines of the Hope hill, none are regular fissure veins, but a series of pockets of ore in limestone have been discovered one after another, and the history of the Hope company shows that about the time the public begin to think they are nearing the end, they have always uncovered a body that assured them new life. The occurrence of faults in the Hope hill mines have heretofore made the explorations of ore bodies very expensive, but of late the company has perfected its system of prospecting by the introduction of the diamond drill, by which means the hidden deposits have been located to a high degree of mathematical precision, and the present body in the Jubilee was encountered by such means many months ago.

NEW MEXICO.

BULLION.—*Southwest Sentinel*, Dec. 30: The Last Chance Mining Co. shipped 105 1/2 pounds of bullion on the 18th inst. worth \$2160.46 and on the 26th inst., 94 pounds, worth \$1946.58. This company milled 660 tons of ore in November and shipped \$5302.32 in bullion, a trifle over \$8 per ton. Steady running is the only need of this mine to bring it to the front as a dividend payer.

TRES HERMANAS.—Mr. James Martin, the lessee of the Contention mine, the property of Judge Bail and others, has rescued it from comparative failure, and by competent mining judgment and push made it a fair producer and placed it on a paying basis. The mine is in limestone, and is situated on a low lying foothill abutting on the plains. The ore consists of cube galena and lead carbonates, and by rough sorting runs 45 per cent lead and from \$13 to \$18 in silver. The last four carloads of ore were consigned to the Pueblo Sampling Works, sold in the open market, and being a desirable product for the smelters, realized its full value and the returns were satisfactory. Three teams are constantly employed hauling ore to the railroad depot at Deming, 22 miles distant, the freight being \$4 per ton. Mr. Taylor is taking out a good grade of ore from the Hancock. He is driving a level from the bottom of a 95-foot shaft to tap another shaft sunk farther up the hill, at a depth of 125 feet. The surface ground yielded quantities of extremely rich horn silver ore, and there is no reason why it should not descend to a much greater depth than has yet been attained. The Cincinnati, the old stand-by of the camp, is worked by a few leasers in a desultory manner. It has produced some \$60,000 worth of the precious metals. Mr. John I. Heatley has held on to a group of mines lying south of the Contention for ten years, and during that period has made many shipments that netted fair returns. Mr. Brockman shipped three tons of ore from the extension of the Cincinnati that was carefully sorted and ran high. Mr. Stewart and a few other leasers on another extension have made small shipments and are making good wages. The entire absence of water in the camp, for either drinking or culinary purposes, is a great drawback, as the nearest well is from three to five miles from the various mines.

BLACK HAWK.—*Silver City Enterprise*, Jan. 2: The Black Hawk mine will probably be worked before many months have passed. This mine produces larger quantities of native silver and argentine ore than any other mine in the world, and would have paid handsomely, only it was systematically robbed. Under competent and careful management, there is no doubt but it is a dividend payer. Wages and supplies cost less than when the mine was worked before, and if all the ore taken out be placed to the company's account, it will be a bonanza for the owners.

CENTRAL.—The new strike at Central extends through two claims. The original location, the Grand Central Silver, owned by Bennett and Potter, has sacked several tons of ore running away up into the hundreds. The owners have had many obstacles to contend with, and have only sunk their shaft to a depth of 12 feet, but hereafter sinking will progress more rapidly and shipments will be large. The Texas mine, the north extension of the Grand Central, is owned by Ross, Holliman and Corn, and has a shaft 18 feet deep. Considerable high-grade ore has been extracted. The lowest grade of ore yet taken from the mine ran 118 ounces in silver; the better grade ran 325 ounces in silver and \$20 in gold to the ton. The vein is 18 inches in width and all ore of the above grade. For the three months, October, November and December, since the Last Chance mill at Sutter Creek started, there has been milled about 2000 tons of ore, which has produced \$16,000 in bullion. In the neighborhood of \$7000 has been produced and shipped during the past 15 days. Heretofore the mill has been handicapped by lack of wood supply and the freezing up of the water. The unprecedented cold snap of the past month has been a severe drawback, but as soon as rough weather ceases, everything is in excellent shape for a continuous run. When the mill is running steadily, it will crush 1500 tons per month, and the returns will be at least \$12,000, leaving a handsome net profit.

OREGON.

TIMBER CANYON MINES.—*Bedrock Democrat*, Dec. 28: The Democrat received a call yesterday from a gentleman interested in the mines of Timber Canyon, a new district situated about 12 miles due east of the White Swan mine, in the Virtue mining district, and we learn that considerable development work is in progress in that locality. Among the

most prominent mines of the Timber Canyon district are the Hay Digger and Davy Crockett, owned by Fuller and Holcomb. Two hundred and fifty feet of tunnel work has already been completed on the Hay Digger, and the ore on the dump assays \$120 to the ton free gold. Another tunnel has been started, and is now under headway to run on the ledge, which will average about four feet in width, and the work is being prosecuted by a force of five men. Work will continue all winter, and it is expected that enough ore will be on the dump by spring to justify the erection of a Tremaine mill, which the owners are now negotiating the purchase. Altogether, there are 14 different locations in the district, and those that have had development work done on them indicate that they are good properties.

ANOTHER OUTPUT.—Wm. Mulkey, one of the owners of the White Swan mine, arrived in the city yesterday with a kettleful of the yellow metal, and deposited it at the Baker City National bank. It was learned that the shipment amounted to \$2200, making the total output of the mine, which has been in operation something over two months, \$38,000. The *Democrat* is informed that the property continues to show up first-class, and in fact, better than ever. It has only been four days since a similar amount was brought to this city, the usual amount of time elapsing between shipments. Another battery was placed in operation Saturday, which will enable the mill to work 12 tons of ore every 24 hours, thus doubling the output.

UTAH.

VALUABLE GROUND.—*Park Record*, Jan. 2: The Bald Eagle group of claims, owned by Mike Qualey and Peter Shanley, and covering the eastern extension of the Ontario vein, is beginning to attract a great deal of attention, and several parties have recently been making inquiries concerning it. This property adjoins the Ontario ground on the east, and is composed of six patented and one unpatented claim, and is acknowledged by almost everybody to be one of the Park's future big mines. It will be crossed by the big Ontario drain tunnel, which will make it a dry mine and greatly reduce the expense of its development. The company that takes hold of the group and sinks a good shaft from 400 to 800 feet deep will find, beyond the question of a doubt, that it is a property just as valuable as the famous Ontario.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

DEWEY PUBLISHING CO., Dec. 29. Object, to publish the RURAL PRESS and MINING AND SCIENTIFIC PRESS. Capital stock, \$75,000. Directors—Alfred T. Dewey, S. H. Dewey, Warren B. Ewer, Alfred Holman and Frank P. McLennan.

FISHING AND CANNING COS., Dec. 29. Nine companies have been organized to establish as many fishing stations and canneries at the following named places in Alaska: Uyak, Nakneck, Little River, Uganuck, South Olga, North Olga, Afognak River, Fort Alexander and Karluk Spit. The directors are the same in each incorporation and are Henry Plageman, Henry F. Fortman, S. B. Peterson, August J. Gerdon and Frederick E. Siebe. The capital stock is \$10,000 in each incorporation.

SAN LUIS M. CO., Dec. 29. Capital stock, \$500,000. Directors—Lloyd Tevis, Joseph Clark, I. C. Stump, W. H. Hearst and W. S. Tevis.

INYO AND KERN CANAL CO., Jan. 5. Object, to conduct water along Owens River valley and Ross Springs valley, into Indian Wells valley, etc. Capital stock, \$1,000,000. Directors—Andrew J. Robinson, Frank H. Austin, G. P. Rixford, J. W. Wesson and H. Ottersen.

GEOGRAPHICAL SOCIETY OF THE PACIFIC, Jan. 5. Object, encouraging and promoting geographical explorations and discoveries, etc. Directors—George Davidson, T. E. Slevin, Henry Durhrow, John Partridge, Louis L. Nelson, A. S. Lowndes and C. Mitchell Grant. The corporation, not being organized for pecuniary profit, has no capital stock.

SAN FRANCISCO AND FRESNO LAND CO., Jan. 6: Capital stock, \$600,000. Directors—H. M. Fortescue, J. P. Martin, Henry Pichoir, J. H. Dohinson and C. L. McCoy.

CHOPE COMBINED ROLLER-SCREEN AND SHADE CO., Jan. 6: Capital stock \$50,000. Directors: T. Chope, A. J. Wilkinson, M. Stern, F. W. Theisen, W. J. Wallis, W. A. Cross and J. W. Shanahan.

PETROLEUM AS FUEL.—The use of aerated ornde petroleum as fuel in place of coal is rapidly extending, and very many of the largest concerns in this country, whose work requires the employment of an intense heat, have adopted this system. The chief lines of work for which it has been introduced are iron and steel forging, tempering, welding, annealing, etc., in glass works, for furnaces, ovens, generating steam, burning lime, burning sewer pipe, heating asphalt, tinning and japanning, oxidizing lead, heating retorts in gas works, etc. An efficient and economical air compressor is a most important factor in the successful operation of these plants, and after a careful examination of the various types of these machines now on the market, the majority of the licensees who were intrusted with the introduction of this new fuel in their several districts, decided to adopt a special design submitted by the Clayton Air Compressor Works of 43 Day street, New York, thus scoring another triumph to the already long list achieved by the makers of these machines. They are now in use in over two-thirds of the oil-burning fuel plants in the country, everywhere performing their duty in a manner to merit the highest praise.

FROST has a variety of effects upon different products. Under the same influence, eggs will burst, apples will contract and potatoes will turn black.

MECHANICAL PROGRESS.

An Interesting Experiment With Steel.

We clip the following from the American *Machinist*, to which journal it was communicated by Charles Wetterer of New York:—It appears that the idea that steel is a chemical combination of iron and carbon is universal; but where is the proof? When two elements combine chemically the nature of both changes; this does not happen when iron is carbonized, but a change does take place; the pulverulent carbon melts. Well, it will be said carbon has never been melted. Be pleased to hear my explanation. The atoms of carbon buried in molten iron are in a very different position, for instance, from that of electric light carbons; it does appear that the fact that the iron is molten has a greater effect on the carbon than the temperature itself. To this action we have a parallel in ordinary illuminating gas, concerning which a prominent work on chemistry says: "The light and gaseous hydrogen possesses in a great degree the power of rendering other bodies aeriform, on uniting with them, even those which are not volatile, just as an eloquent speaker can communicate his enthusiasm to an indifferent audience."

To prove this idea I have succeeded in crystallizing carbon taken from steel wire nails, iron cut nails, and steel filings, by dissolving them in acids. It is, however, a difficult thing to do, the chief obstacle being that about 98 per cent of iron must be dissolved in order to obtain about 2 per cent of carbon. If the dissolution of the iron is violent, the gases generated carry the nascent carbon to the surface, where it is oxidized by the oxygen in the air, causing small explosions that are easily perceived in sunlight; to this nascent state of the carbon its power to crystallize is due. If the action is less violent, or the carbon artificially obstructed, that which is so obtained resembles lamp-black; sometimes a body of the same consistency is formed, but it is white.

My first experiment was to dissolve a small quantity of steel filings in about a teaspoonful of acid, which resulted in a few small crystals, but, nevertheless, larger than the grains of steel; by pressing these crystals into my thumb nail and drawing them across glass, they cut or scratched, as only diamonds can. The result of the past six months of experimenting is small, but efficient, I think, to establish my theory.

It may be mentioned here, in support of this argument, that diamonds on being placed in the electric arc, melt, oxidize and disappear like a flash; carbon in steel, on being burnt, behaves in the same manner, which would indicate not alone the separate existence of carbon, but that it is molten.

It appears to me as reasonable that when steel is heated, the atoms of carbon have a tendency to unite, and form comparatively large particles; when slowly cooled, these particles remain large, but on being chilled the molten particles are shattered to atoms; in this way the surface area of diamond presented to iron may easily be increased from 10 to 100 times. With this increased surface contact, and the more thorough diffusion, it is not difficult to understand why steel should harden on being chilled. It is also possible that the different conductivity of carbon and iron, and electric currents set up in the chilling metal, have their influence on the arrangement of the atoms, and possibly, on the degree of hardness or tenacity; by drawing temper the atomic diamonds begin to gather and rearrange slowly, until the proper degree of hardness or size and arrangement of diamond particles is shown by the color, when further progress is arrested by quenching.

Fast Railroad Trains.

London *Engineer*, in commenting on the performance of the fast train on the New York Central road, says: Taking the American run as a whole, it constitutes a distinct departure in railway work. Not the least remarkable feature about it is that it shows that it is possible to attain very high speeds with comparatively small coupled wheels. It by no means follows, however, that it is advisable to retain them for very fast trains. On the other hand, we believe that very high wheels are equally out of place if very long runs are to be made, because on snob runs it is certain that more or less steep inclines will have to be surmounted. If the average speed of a train is to be about 50 to 55 miles an hour, then banks may be ascended at 40 miles an hour, or even less, and descended at 60 to 65 miles an hour.

But when an average speed of 60 miles an hour must be made, we cannot rely on descents to compensate for ascents, because enormous velocities would be required, and the cost and wear and tear would be out of all proportion to the advantage gained. The engine must, therefore, be competent to maintain a high speed when running uphill, and this is almost impossible if very high wheels are used, unless the cylinders are too large for the rest of the road.

As these high-speed, long-distance trains cannot be heavy, it appears to us that the best type of engine would be one with 18 inches cylinders, 26 inches stroke, 1400 square feet of heating surface, 20 square feet of grate, and single drivers carrying about 18 tons, and 6 feet 8 inches in diameter, provided with the sand-blast. Such an engine would be an admirable bill-climber, and would run about as

fast as any locomotive made. When the runs are over comparatively level roads, then a high wheel, such as Mr. Stirling proposes, is no doubt good, because its use reduces wear and tear.

Whether any extremely fast running will be done in this country remains to be seen. Any speed that can be attained in the United States can, of course, be got here on our better roads; but it is more than questionable that these excessive speeds pay. Whether they do or not is really the whole question. The problem is not one for the locomotive superintendent, but for the general manager.

HOW LONG IT TAKES TO MAKE A GOOD MACHINIST.—Prof. Sweet, an able writer and a man of large practical acquaintance with mechanics, says: A good machinist can be made in less than three years. I don't believe every young man can be made into a machinist in that or any other length of time, but I believe likely young men can be made into good machinists about as Josh Billings believed in the universal salvation of men: He believed it, but he wanted to pick the men. I once had a young man work for me somewhat on the plan detailed by J. A. Gilkinson, in his communication headed: "An Industrial University." This young man wanted a job badly. There were particular reasons why he should be earning good wages, and he made an agreement with me to be paid just what, in my estimation, he earned each week, except for the first, for which he was to receive \$4; just enough to pay his board. It never seemed to trouble this man to learn. His mind was on his business, and his whole heart in it. I fully believe that half the kinks and makeshifts employed by old lathe and planer hands were reinvented by this man as needed by him. He used common sense, backed up by good brains, and in less than six months was worth journeyman's wages to me, and he got it.

SKILL RUNS IN THE FAMILY LINE.—It is well known that the Japanese are very skillful workmen, and the reason for this is undoubtedly accounted for in the following extract from an exchange: In Japan apprentices begin to learn their trades usually much earlier than in our country, so that when majority is attained the mastery of the crafts is thorough. Another striking feature of the Japanese system is that of heredity. Skill runs in family line. Not a few of the famous artisans of the present decade are descendants in the ninth, tenth and even twelfth generation of the founder of the establishment. A carpenter in Fukui can boast of his ancestry of woodworkers through 27 generations; and the temple records show such hoarding to be true, though often adoption interrupts the actual blood line. At a paper-makers' establishment in Awotabi, in Echizen, the proprietor's ancestors first established the industry a thousand years ago. The same as above, so far as skill in the family goes, is as true of China as of Japan.

MAKING STEEL BALLS.—Mr. Fairbairn of Manchester, England, has devised a machine for making steel balls, in perfect spheres. The machine is provided with two horizontal disks, each having on one of its faces a spiral groove starting from near the rim and ending at the center. The disks are placed one above the other, the lower one having a hole in the center through which the completed ball drops. The disks revolve in opposite directions. In operation, a heated steel bar is placed between the outer rim of the disks, a piece of the proper size is at once cut off by the machine, and carried through the grooves to the center, when it is dropped a nearly perfect sphere, needing only a little shaping in a proper machine to make it a perfect sphere.

WELDING CABLES BY ELECTRICITY.—Some very interesting experiments in welding cables by electricity, for use on cable roads, have recently been made by the Thomson Electric Welding Company. It has been demonstrated, so it is claimed, that while by means of a splice 30 per cent only of the strength of a perfect cable can be secured; by an electric weld, which can be readily made, 87 per cent of the efficiency can be attained, thus proving the greatly superior efficiency of the latter method of making joints on cables employed for traction purposes.

SUSCEPTIBILITY OF IRON TO BECOME BRITTLE. It has been found by experiment that, as regards chemical composition, the susceptibility of iron to become brittle by pickling and rusting is least in cast iron and silicon steel, and highest in wrought iron, and, according to Bidecer, in high carbon steel. Combined carbon appears to increase the action and silicon to diminish it. The influence of manganese in either direction has not as yet been determined.

German engravers harden their tools by heating them to a white heat and then plunging them into sealing wax, continuing the operation until the tool cools. By this method, the steel becomes almost as hard as a diamond, and when touched with a little oil, is excellent for engraving or for drilling into other metals.

A UNIVERSITY CHAIR OF LABOR.—The first chair of labor ever instituted in Europe was decreed by the Paris Municipal Council, last July. Henry Reville has been named as professor.

SCIENTIFIC PROGRESS.

Progress of Electro-Magnetic Science.

Discrediting upon the progress of electro-magnetic science, Prof. Arthur E. Kennelly recently observed that the following facts seem to have been fully established: First—in electro-magnetic science the great achievement since Faraday's time has been the determination that all electricity flows, or tends to, in closed curves or circuits, so that we have the electro-static circuit, the galvanic circuit and the magnetic circuit, each resembling, as it were, an endless chain, or a bundle of endless chains; and the laws which control these three different types of circuit show wonderful analogies. Second—the due appreciation of the influence of the ether and its importance in all electro-magnetic phenomena. While originally the electrical activity seemed to be confined to the battery or conducting wires of a galvanic circuit, it is now believed that the ether surrounding these conductors plays fully as active a part in the process of conduction, and the mind sees free space no longer void, but filled with an active and responsive substance—the ether. It looks almost as if matter were inert in comparison with the ether which surrounds it. Third—the evidence in favor of the proposition that light is a vibratory disturbance in the ether of an electro-magnetic nature is such as almost to amount to demonstration. When this shall be generally accepted, the whole domain of optics and radiant energy will be enrolled as one department and property of electro-magnetic physics. Light, although seemingly so unsubstantial and powerless, is labor, and requires force to generate it. Every ray of light that vibrates in space is full of force and energy. Every ray that comes to us is the product of chemical labor applied to distant stars by elements such as oxygen, carbonic acid, etc., in the fierce tumult of chemical union and decomposition. The day will surely come, says Leo Silberstein, in which electricity will be generated directly from the heat of burning dynamos.

Fluorine Flames.

In connection with the research that is being made into the problem of the production of light by other means than by combustion, it is of interest to remark some of the experiments of M. Moissan upon the gaseous element fluorine, which he has recently succeeded in isolating. Fluorine seems to answer to that ideal conception of the old alchemists—the universal solvent. It possesses most intense chemical activity. The gas is obtained by electrolysis, conducted under a variety of ingeniously devised conditions necessitated by the corrosive nature of the product. Many different sorts of flames are produced by allowing fluorine gas to come into contact with other elements. With hydrogen, combination takes place explosively even at a temperature of -23° , and in the dark. If a tube delivers fluorine into an atmosphere of hydrogen, a very hot blue flame, bordered with red, at once appears at the end of the tube. Bromine vapor combines with fluorine in the cold, with production of a very bright, but low-temperature, flame. Iodine gives a pale flame; phosphorus and arsenic combine with fluorine with lively incandescence. Carbon in a finely divided state combines with fluorine even at ordinary temperatures. Purified lampblack inflames instantly with great brilliancy, as do also the lighter varieties of wood charcoal. The amorphous variety of boron likewise ignites instantly in fluorine, with projection of brilliant sparks; but the most heartful of all these extraordinary displays of chemical activity is the reaction between fluorine and silicon. The cold crystals immediately become white hot, and then burn with a very hot flame, scattering showers of stars in all directions. Many other substances burn in fluorine, according to details published by M. Moissan in the *Annales de Chimie et de Physique*. The reason for some of the flames produced being of low temperature, though of high illuminating power, is a matter demanding further investigation.

PRACTICAL AND SCIENTIFIC KNOWLEDGE.—All knowledge, remarks a contemporary, is comprised in two classes. The first is that effect of mind which is the result of curiosity, that species of human instinct which prompts us to inquire the reason for everything we see, every action which takes place among others, among all living beings, among the elements and among the celestial bodies. Mankind being endowed with reason, the next impulse is to apply the knowledge so gained to some useful purpose, to produce some benefit to ourselves. The first of these two classes is called "scientific investigation," the second is called "applied science." For instance, we notice for the first time a light from which smoke arises; we investigate, we perceive heat, and that it produces a disagreeable sensation. These are the first scientific facts. We apply the knowledge so gained by resolving never to touch fire. This is applied science. We have employed curiosity to find out the facts. We now employ caution to guard ourselves against damage, and we determine never to touch fire. All knowledge so gained is by this process; we may be told a thousand times that fire will burn, but we feel that that is only theory. We want facts, and we obtain them by a course of scientific in-

vestigation. We use these facts and thus gain experience, knowledge, at first scientific, next practical; and these two conditions make up the sum of all knowledge. Science is the foundation, practice the superstructure.

THE CAUSE OF GEYSERS.—Bunsen has explained the periodical eruption of geysers in such a satisfactory manner that doubt is no longer possible. A cavern filled with water lies deep in the earth, under the geyser, and the water in this cavern is heated by the earth's internal heat far above 212° , since there is a heavy hydrostatic pressure upon it arising from the weight of water in the passage or natural stand pipe that leads from the subterranean chamber to the surface of the earth. After a time the temperature of the water below rises, so that steam is given off in spite of the pressure, and the column in the exit tube is gradually forced upward. The release of pressure and the disturbance of the water then cause the contents of the subterranean chamber to flash into steam and expel the contents of the exit pipe violently. These eruptions may also be provoked by throwing stones or clods of turf into the basin of the geyser. The water in the cavern below is disturbed by this means.

THE PROBABILITIES OF A CELESTIAL CATAclysm.—A German astronomer, Herr Jager, has arrived at the conclusion, based upon observations made by Mons. Hormonn on the movement of 49 stars in the vernal region, that the solar system, with reference to the relative positions of the visible stars, moves with a velocity of 20 miles per second; the mean speed of the so-called fixed stars being about 27 miles per second. Herr Jager goes further; by means of calculations analogous to those of the kinetic theory of gas, he estimates that each star encounters another in 325 billions of billions of years. The probabilities of a celestial cataclysm consequent upon the impact of two or more sidereal bodies are therefore apparently very remote.

IMPROVEMENTS IN SUGAR MANUFACTURE.—It is said that recent improvements that have been made in the manufacture of sugar from the sorghum plant deprives the sugar of an objectionable flavor which it has previously had. It is also claimed that by the new process the yield is materially increased. The new process is thus, in part, described: "Alcohol is mixed with the sorghum syrup, and after treatment the former is recovered by redistillation, so that there is no appreciable loss. In the use of five barrels of alcohol, only a quart or so was lost. The sugar is nearly white, and it is strong in saccharine qualities—above 90 degrees."

THE REPORT FROM SMOKELESS POWDER.—According to Hiram Maxim, who is probably as well acquainted with the matter as any other person, the discharge of a rifle loaded with smokeless powder is not noiseless, as is generally supposed. There is no such thing, he says, as noiseless gunpowder. The report from a discharge of smokeless powder is much sharper and higher-pitched than that from black or ordinary gunpowder; it cannot, however, be heard anything like so far away. The recoil of the piece is much less, also, with smokeless powder.

THE SELF-PURIFICATION OF RIVERS.—Professor von Pettenkofer has been studying the Isar River, which flows through Munich, carrying the city's sewage. He says that five miles below the city there is not a trace of the pollution which finds its way into the river. Some observers have thought that the self-purification of rivers is due to deposition of sediment. Dr. von Pettenkofer, however, maintains that the real agent at work in purifying the Isar river is the oxygen of the air which is absorbed by or dissolved in the water.

THE BIRTHPLACE OF COLUMBUS.—The savants and historians of Italy are now deeply interesting themselves in the question of Columbus' real birthplace. Five or six places besides Genoa claim the honor, and among them is Bettoia. It is reported that proofs have lately been discovered establishing Bettoia's claim, and that the town will erect a monument to Columbus at once, and intends to send an envoy to the World's Fair with these proofs and other historical documents of interest.

THE EARTH'S AXIS UNSTABLE.—Since it has been ascertained with a good degree of certainty that the earth's axis is unstable, to a certain extent, all scientific calculations based upon the assumption that the axis is permanent are misleading. This, it is claimed, accounts for the miscalculations of astronomers during the past 200 years.

COLOR FOR WAR SHIPS.—The French are now painting their war vessels a dull, sulphurous gray, exactly the color of smoke as it rises from cannons. They say this color has the advantage of being as filthy and indistinguishable in fog and sea mists and darkness as during the smoke of battle. It is more baffling to the search light than any other tint.

A MODE OF OBTAINING ELECTRICITY.—It is said that a Frenchman has invented a new and ingenious frictional machine. Mercury is forced by means of a pump through the pores of a piece of cambric, and electricity in considerable quantities is generated by the friction.

ELECTRICITY.

Electro Culture.

Interesting Experiments with the Electric Light on Leaf Plants, Tubers, etc.

A most interesting and extensive series of experiments was made by Professor Bailey at the Cornell University Experimental Station at Ithaca, N. Y., during the winter of 1889-90 from the report of which we condense as follows:—A conservatory was divided into two compartments in one of which plants were treated in the ordinary way, with sunlight by day and darkness during the night. In the other compartment the same class of plants was subjected to sunlight by day and the electric light during the hours of darkness. The conditions of temperature were kept equal in both compartments. The object of the experiments were to note the effect which the electric light might have by supplementing it during the hours of darkness on the growth of plants.

The house was low, as to the ceiling, with a flat roof, and 20x60 in area, divided by a tight board partition and warmed by steam. In the part where the electric light was used, the lamps were hung low—2½ feet above the soil in which the plants were grown.

The general effect of the light was to greatly hasten the growth and maturity of most of the leaf plants. Those plants nearest the lights grew more rapidly than those a few feet farther away. This tendency was particularly marked in leaf plants, such as spinach, arcess and lettuce; but the plants tended to "run to seed" before the edible leaves were formed. The spinach, under the influence of the electric light, matured and produced good seed, while that in the dark at night was still making large and edible leaves.

The most marked and favorable results were obtained in the growth of lettuce. Three weeks after transplanting, those under the influence of the electric light were fully 50 per cent in advance of those grown in the dark house. The heads from the electric light were placed on the market two weeks earlier than those grown under the usual conditions.

Ridishes showed very unfavorable results, so far as size was concerned; but they were much earlier in maturing. It was found that the electric light exerted a much more favorable influence when it was covered by a thin glass globe than when naked. It was surmised that this difference arose from the supposed fact that the glass absorbed or obstructed the highly refrangible and invisible rays. The experiments, on the whole, seemed to justify the conclusions that, while the naked electric light has a damaging influence upon the plants near it, electric light promotes assimilation; it often hastens growth and maturity; it is capable of producing natural flavors and colors in fruits; it often intensifies colors of flowers, and sometimes increases the production of flowers, and that periods of darkness are not necessary to the growth and development of plants. Professor Bailey believes it is only necessary to overcome the difficulties, the chief of which are the injurious influences upon plants near the light; the too rapid hastening of maturity in some; and, in short, the whole series of practical adjustments of conditions to individual circumstances to render electro-horticulture a success. Deherain, a French experimenter, says that the injurious rays from the electric light are greatly modified by a transparent glass. Professor Bailey's experiments with an electric lamp, protected by an ordinary white opal globe, gave results much less marked than that of the naked light; in a word, the injurious effects were lessened by the use of the globe.

Some of the experiments show that injury follows the use of electricity when that light is used at a critical time, as, for instance, when the young plant is losing its support from the seed and is beginning to shift for itself. The best results seem to follow the later use of electric light. On the whole, the opinion is expressed by Prof. Bailey that there is a future for electro-horticulture, when all the conditions of treatment are fully understood. Further experiments will be made and reported upon as soon as the results are reached.

AMERICAN AND ENGLISH ELECTRICAL ENGINEERING.—Some of our traveling transatlantic cousins are indulging of late in lugubrious letters to their home journals on the asserted bad construction and generally loose work of electrical engineering on this side of the Atlantic. These observations are generally characterized by very loose statements and hasty conclusions, which will not bear a very close scrutiny. A test, however, will soon be forthcoming at Chicago, which will show to the world the truth in this matter. European electricians will be invited to place their work by the side of similar American work in electric service. Of course, both sides will be put upon their mettle for good work, and the result will be a prodigious display, such as has never yet been placed before the world at any exhibition. Americans have no fear of the final outcome.

ELECTRIC LAUNCHES AT SEATTLE.—It is reported that a Seattle electrical expert is fitting up a number of launches for Lake Washington with storage batteries, by which they will be propelled, charged from the trolley wires of electric railways. These will be the first electrically propelled water craft on the

Pacific Coast, and will run for eight hours without recharging. They will be constructed on the Herreshoff model, with a speed of from eight to ten miles per hour. Launches of the same pattern are said to be in common use on the river Thames. It will require four hours to charge one of the batteries, but the added weight after recharging is inappreciable, so that it is carrying a power that is of no burden to the boat. In connection with the above, we notice a proposition for a bicycle elevated road, to be operated by electricity, between Tacoma and Seattle. The distance is 36 miles, and it is estimated that it will take but 40 minutes to make the trip, whereas by steam it requires an hour and three-quarters.

New Electric System.

It is said that a new electric railroad system has been tried in Europe, in which neither poles, wires, nor storage batteries are used. The Chicago News says that the system is to be tried in that city at once, and describes it as follows:

"The electric current passes through a conduit beneath one of the rails, but not in contact with it. The current does not touch the rail and there is no danger from electricity by reason of coming in contact with the tracks. The voltage is so low that in case of a shock being given there would be no ill effects. But this is said to be impossible, for every portion is so well insulated that none of the current can escape. The rail is double, with an aperture in the center, through which connection is made with the current in the conduit. The other rail may be used as it is used in the ordinary street car track. In outward appearance the electric car is similar to the ordinary street car. The motor is below the carriage, enclosed in a protecting box placed between the axles. The power is applied by means of a chain-gearing working over a cogwheel on one of the axles. Below the platform are appliances that enable the driver to regulate the speed of the car. It is claimed that the road can be operated much more cheaply than the ordinary electric line, as it requires a much less voltage."

Considering the rapidity with which new devices in relation to electric railway traction are being brought forward, there need be no fear but that the world will soon be put in possession of all that is needed to make that mode of transit a complete success. We may have to put up with much inconvenience in the way of trolley wires, unsatisfactory storage batteries, etc., and even large amounts of money will be lost in the various unsuccessful improvements suggested. These things are all inseparable from all great pioneer enterprises; but the public will eventually find exactly what it wants and be happy.

SWITZERLAND seems to have taken the lead of the world in the electric transmission of power, at least so far as number of enterprises is concerned. The contracted limits of her territory are somewhat of a hindrance to long-distance transmission, but the energy displayed in this regard in Switzerland is worthy of all praise. We have before us 17 cases of electric transmission in that country already in operation, besides several now in course of construction or fully decided upon. One of these latter will transmit by means of five turbine wheels of 350 horse power each. The work is being done for some extensive spinning mills. Four aables are employed, each having 0.437 of a square inch section, and they are carried on towers across a river span of 336 feet. At the power station there are two dynamos of 300 horse power overcompounded, and there are three motors at the mill—one a twin machine of 350-horse power and two of 60-horse power in different parts of the premises. The commercial efficiency of the plant at full load is 78 per cent. The cost of the installation was \$68 per horse power delivered, and the cost of power is \$14 per horse power per year at the rope pulley of the turbine.

ELECTRIC LIGHT IN FOGS.—Evidence seems to be accumulating in regard to the inefficiency of the electric light in fogs. According to *Electricity*, the pilots of Havre complain of the lack of penetrating quality observed in the electric lights in the harbor. They say that during foggy weather, the brilliancy of the electric light is much more reduced than that of oil lamps—so much so that in very foggy weather while the light from oil lamps was plainly visible, it was impossible to discern that of the electric light. The London *Electric Review* states that the electric lights in some of the lighthouses, especially those near the entrance to the Thames, sometimes become invisible, while at the same time the lights from the lightships and lighthouses burning oil and even the gas lamps in towns on the neighboring coast are plainly visible.

ELECTRICITY VS. COMPRESSED AIR.—Mr. Albion T. Snell made the statement before the South Wales Institute a short time ago that he had demonstrated that electricity would pump water or haul coal with an efficiency which was something like double that obtained by compressed air.—*Electricity*.

THE ELECTRIC LIGHT IN FACTORIES.—The benefit of the electric light in the factories of Germany is said to have been so marked that it is proposed to make its use compulsory in all works where artificial light is employed during working hours.

GOOD HEALTH.

A "Home" for Cancer Patients.

In view of the alarming increase in this city of the dreadful melody known as cancer, and the want of adequate facilities for the proper care and protection of those who come here for treatment, several of our philanthropic citizens, many ladies among them, have for some time been looking about for a place and site for means for the establishment of a "Home," where those thus afflicted might find shelter and proper home comforts, while under treatment for cure, or while suffering the tortures which are inseparable from the more advanced condition of this malady, under which no treatment can save, but merely ameliorate sufferings which end only in death. Such a home is especially needed in this city, which is the natural and most convenient resort for treatment of those on this coast who are afflicted with this malady.

Those interested in this humane work have finally met with the fullest success at the hands and through the favor of a most worthy and active association of benevolent ladies known as the "King's Daughters." This association has recently been placed in possession of the building owned by the city and occupied by the Old People's Home up to the time that, through the benevolence of Mrs. Charles Crocker, that association came into possession of their new quarters on Pine street.

The "King's Daughters" have refitted and refurnished this building, and made of it a most homelike and comfortable dwelling-place for invalids, for which purpose the city allowed them the use of the premises.

On looking around for inmates for their new Home, their inquiries naturally led them to consider the condition and needs of the large and increasing number of those unfortunate who are afflicted with the generally unpossessioned melody of cancer. Pursuing their inquiry in this direction, they soon became acquainted with the fact that that class of invalids were greatly in need of just such a place, as they had to offer. They moreover were made well cognizant of a further fact of which they only previously had dim knowledge—that cancer patients were being successfully treated in this city, and restored to health without the use of either plaster or the knife, or any other treatment which entailed pain or suffering beyond that which was inherent in the malady itself.

After full inquiry and consultation, it was determined to devote a portion of their rooms to patients undergoing such treatment, and to install the practitioner, Mrs. C. A. Cook of 224 Post street, who is the discoverer and dispenser of that benign treatment, in charge of such patients.

Within one week after the rooms were ready, five patients, each with a nice cozy room, were enjoying the accommodations offered, and the treatment, all of whom are now doing well, with every prospect of an early and complete cure. Several other rooms will soon be occupied by the same class of invalids.

It is One of the Most Remarkable Facts Connected with medical practice, that, of all other maladies, this one alone is regarded by the profession as absolutely incurable. Such an opinion has been held by them so long that it has become obnoxious, and seems to be an ineradicable from the minds of a majority of physicians as is the malady itself from the bodies of their patients by their mode of treatment.

If the work so well begun by the good "King's Daughters" should result in eradicating this nonprogressive and false idea from the minds of our conservators of health, they will have accomplished a work which will entitle them to a monument bigger and more beautiful than any such structure ever yet erected; for it will lead to the saving of more lives from terrible deaths than have been sacrificed by all the great military heroes in whose memory the chief of all the great monuments of earth have been erected.

The "King's Daughters" constitutes one of the leading benevolent associations in the country, and doing an immense amount of good. They number over 1000 in this State and fully 30,000 in the Union. They have State and National organizations, by which the work of each society is known to all the others. Through this organization, the work of this society will in time be made known throughout the Union, and the good news, which will soon be made evident in this city, that cancer is curable, will in time reach the stricken victims everywhere and lead to a movement which will eventually place the San Francisco treatment within the easy reach of every city and town in the Union—and the world as well.

Yes, the Remedy Is a Secret One,

And so was Koch's; yet the "regulars" from all over the world rushed to Berlin to get the secret remedy, learn its mode of application, and take it to their homes for trial. No matter if it was a failure. The principle involved was all the same. A medical man of high standing was the discoverer. In the present case the discoverer is a woman of humble practice. But what of the secrecy. All that is asked for is a medical investigation to prove either that the remedy is what is claimed for it or that it

is a swindle. The doctor invites the test. If no competent medical authority in this city will take up the glove, is it not fair to suppose that they dare not do so? If they dare not do it, can any but a sinister motive be the hindrance? If the faculty refuse to investigate, the work which has now begun will soon speak for itself and settle the matter to the satisfaction of all reasonable persons.

But, further, with regard to the secrecy of the remedy, our healer may lack science, nay, she may be even selfish, if you please, holding the knowledge of a remedy for private gain, when the scientific profession would give the same to the world. Such things are a minor consideration and should have no weight whatever when the lives of thousands are at stake. The fact, which are within the reach of every one, are that scores of cancer sufferers in this city are constantly receiving permanent relief by purely constitutional treatment, without the use of the knife or amputation. The most of these cases have been pronounced unmistakable cancer by leading physicians and surgeons, and many have submitted to previous surgical operations, without any beneficial result. This assertion is made with due regard to its import, and proof will be presented to any one interested, by the writer, whose initials are well known in this city. With these facts in view, which are well known to hundreds of our citizens, it would seem that the theories and antiquated ethics of the doctors are entirely unworthy of consideration. W. B. E.

USEFUL INFORMATION.

A Substitute Needed for Whalebone.

As is well known, whalebone is getting to be a very scarce article and very high in price. The catch of whalebone by our whaling vessels for the year 1854 was 3,445,200 pounds; for the year 1870, 703,000 pounds; for the year 1890, only 300,710 pounds. The average price of whalebone in the raw state, as taken from the whale, for the year 1854, was 34 cents per pound; for 1880, \$2 per pound; for 1890, \$4.22 per pound. The figures show that the supply is rapidly diminishing, while the price is continually increasing, and the entire product could be consumed many times over for any one of the uses for which it seems particularly adapted, and from its high price, it is evident that some substitute must be used. Whipl manufacturers are feeling the scarcity and high price of the material more than any one class of consumers. The nearest to a practical substitute yet found is featherbone, made from the large enameled quills of the goose and turkey. Featherbone is very durable and elastic, and is now being used largely in the manufacture of whips, and though much cheaper, possesses more of the nature of whalebone than any material yet found.

The whale fishery, from which the supply of whalebone is obtained, is very rapidly decreasing. Fifty years ago, the business was at its climax, and there were 735 vessels engaged therein. In 1856, that number had been reduced to 159. According to the Census Bulletin, No. 123, just issued, there are now only 101 vessels in the trade, of which 27 hail from San Francisco, and 70 from Massachusetts. The decline of whale fishing is due more to scarcity of whales than to the introduction of mineral oil.

The Behring straits fishery commenced in 1848. In 1851, that branch of the business numbered 250 vessels. There are now only 65 thus employed from the entire country.

FLUID FOR RENDERING OIL PAINT INDELEIBLE. This invention is chemical in its nature, and will rank among the valuable discoveries of the time. It has the effect of preserving the colors in their full strength, and, being transparent, will not modify the character or hue of the various colors, but will prevent subsequent dimness from exposure. The ingredients are readily attainable and not at all expensive. The formula can be obtained, together with legal authority, for its use, by persons disposed to business. This compound of fluid and paint may be used in etching or painting designs upon all kinds of fabric, including silk, satin, velvet, plush, cheese cloth and canvas, and makes a mark which is acid resisting and water resistant, and hence highly desirable. The fluid is also valuable for thinning down paint, and it constitutes a drier which causes the paint to dry quickly, and thus facilitates finishing up oil paintings. This compound is of great value, and is in a line of commodities which has great demand. The inventor is Mr. Richard W. Surry of Battle Creek, Mich.

THE NOISY WHISTLE.—In most cities and large towns in the Union, the morning whistle of the steam plant is heard. It sounds its lengthy note from six to seven in the morning and is what may be called, without stretching a point, an unmitigated nuisance. There is no good reason why a man with a one-dollar clock shall not know when to get up and when to go to his work. The whistle on workshops is one of the things that ought to go. Moreover, it should be borne in mind that the steam which blows the whistle is lost for usefulness in driving the engine.

LONG-LIVED FISH.—Hundreds of fish are still alive in the royal aquarium in St. Petersburg, which were placed there from 100 to 150 years ago.



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W. B. EWER,..... SENIOR EDITOR

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SAN FRANCISCO:

Saturday, January 9, 1892.

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Ining Machinery—F. A. Huntington.
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Passing Events.

Anticipating the request of the State Mining Convention, a Congressman from this State has already introduced a bill providing for the construction of debris-impounding dams; and also providing for a system of licensing the gravel mines, so that they may be worked. This is a step in the right direction, and may well serve as an indication that Congress will take the subject up and act upon it in one way or another.

Several instances are reported this week where companies have commenced systematic prospecting operations with diamond drills. It is probable that in the future this plan will be largely followed, and much time and money saved.

The various mining counties of the State are preparing, by local conventions and meetings, for the State Mining Convention, which meets here January 20th. It bids fair to be a large and enthusiastic gathering of mining men.

The Fresno county stone quarries in 1890 yielded 10,607,000 pounds. In 1891, the output was 16,044,000. The increase shows that the use of stone in architecture is gaining in public estimation. The county has an exhaustless quantity of building stone of excellent quality.

Announcement.

On the first day of the new year the proprietorship of the MINING AND SCIENTIFIC PRESS was transferred from the firm of Dewey & Co. to an incorporated company, which has assumed the title of the Dewey Publishing Co. In the firm by which the paper was established in 1863, and by which it has since been published continuously, Mr. A. T. Dewey and Mr. W. B. Ewer were equal partners. In the incorporated company, each of these gentlemen holds a one-third interest, and the other third is held by Mr. Alfred Holman, who, as general manager, assumes the active administration of the business. By way of introducing Mr. Holman to the patrons of the MINING AND SCIENTIFIC PRESS, it may be said that he comes from the editorship and general management of the chief newspaper of Washington—the *Post-Intelligencer* of Seattle—and that prior to his connection with that journal, he was for many years with the *Portland Oregonian*.

The patrons of the paper should know that the incorporation has no other purpose than mere business convenience. There will be no revolution in the character of the paper, though it is hoped very shortly to add to it some features that will commend themselves to the public. Of the designed improvements, it is perhaps as well not to make promises, but it is hoped that the efficiency of the paper will be increased and that it will continue to receive from the public the favor which has attended its course during the twenty-eight years of its existence.

The firm of Dewey & Co., Patent Agents, composed of A. T. Dewey, W. B. Ewer and Geo. H. Strong, is not included in the incorporation and will continue to be conducted as heretofore under the name of Dewey & Co., Patent Agents.

To Regulate Hydraulic Mining.

The agitation of the question of permitting the hydraulic miners of California to again resume operations is already beginning to be felt in Congress, to which body, in fact, the solution of the matter must ultimately be referred.

Representative Geary has introduced a bill which provides that the President shall appoint three engineers who will comprise the Mining Commission of California, and all persons intending to mine by the hydraulic process shall apply to the commission for a license, giving a description of the land, the mode of mining and the appliances to be used. If the commission is satisfied that the mine can be operated without material damage to the rivers a license will be issued, but if the commissioners should find that damage would result unless dams or other works were built, it will be their duty to see that these works are properly constructed, and then they will be empowered to issue a license.

Mr. Geary sets up a definition for "material damage," which the Commission will be compelled to interpret closely. It is this: "When the amount of debris accumulated in the river is no greater than the amount of alluvial or other deposits caused by ordinary farming, then there is no material damage, but when the debris of hydraulic mining is greater than the amount deposited by farming, damage is being done, and the license shall not issue."

The bill also appropriates \$250,000, to be spent under the provisions of what is known as the Biggs bill for the construction of two dams, one at Bolard's bar in Sierra county, and the second on the north part of the Feather river, at some point to be designated by the Commission, the work to be done under the eye of the Secretary of War.

There is nothing in this bill of Mr. Geary's to which great exception can be taken. The U. S. engineers, who have already examined the mining and farming country in the region where the trouble exists, have reported that there are isolated cases where hydraulic mining can be carried on without damage to other in-

terests. They have also reported that in most other cases a system of dams will restrain the heavy debris so that the mines can be operated. It is probable that the miners would be satisfied with the decision of a Board of disinterested engineers as to whether any particular mine could be run or not, for that would be a relief from the present system where the decision rests with a judge who knows nothing of mining matters, and who has his ideas on a common law established where very different conditions prevail.

As to the definition of "material damage" in comparing the amount of "wash" from the mines or farming lands, that would probably not be a bar to mining, since the dams would restrain the larger proportion of the debris, which would not then injure the rivers.

Mr. Geary's provision for the construction of two dams by Congress is about what the miners intend to ask for at the coming convention in this city. They know very well that they must ultimately build the dams, but if there is any experiment about it, or any danger of the dams being condemned, the onlay for the typical dams to test the matter should come from the Government.

The Mining Convention.

The miners of California can congratulate themselves on the fact that their proposed convention in this city on the 20th inst. is receiving favorable attention from the press and public. As it gradually comes to be realized by those who have given the subject no thought, that the miners are asking nothing unreasonable, and that they only want to be permitted to conduct their business in a way that shall injure no other interests or individuals, there is a disposition to "give them a fair show." Their project has thus far met with approval on all sides. Of course there are a few men who cannot see and do not want to see any attempt at renewal of an industry that has committed damage in the past; but the people generally are willing to see the miners meet, and hear what they have to say, and willing to drop all prejudice. Already three of the daily papers of this city—the *Examiner*, *Chronicle* and *Post*—have editorially inclined in favorable terms of the convention and its purposes, basing their opinions on the proposition that the miners only want to work their claims in a way that no harm shall be done to others.

It has been long since such expressions have appeared in any of our large city dailies, and this is one of the straws which shows the change in public opinion in the past few years. It is even to be noted that at a meeting of a County Farmers' Alliance, resolutions favorable to hydraulic mining have been passed, if conducted on the basis proposed.

The merchants of this city are also favorably disposed. They have long felt the loss of trade due to the closing down of an industry which was a productive one, and which put large amounts of money in circulation every year. They, like others, are tired of the controversy between the miners and farmers, and now that disinterested engineers, appointed by the Government, have suggested a basis of settlement, want to see the plans tried.

The miners themselves, when they meet in this city on the 20th, should remember that they have the sympathy of a large portion of the public in their misfortunes, and should do nothing to alienate this feeling. If they only demand what is recommended by the Government engineers, no fault can be found with their action. Competent authority has come between the two contending factions and pointed out a method which each should accept. It is useless to attempt any other plans or try to evade the opinions of the engineers. Thus far, judging by the resolutions adopted at the different county mining conventions, there is no disposition on the part of the miners to ask for more than has been recommended. But they do want Congress to let them work on the plan suggested by the men appointed to settle the matter.

Safety in Mining Cages.

Just one year ago this week, an accident occurred in the Utica mine, at Angels, Calaveras county, where, by the parting of the cable, the skip was dropped 450 feet down the shaft and 12 men were killed. Very naturally, Mr.

Lane, the superintendent of the mine, began to provide against any future accident of the kind and looked out for some safety device not depending upon the cable or king-holt tension for its effective action in case of trouble. The rope that broke was a new steel wire one, warranted to hold 40 tons, and the ordinary safety devices were on the cage.

Some little time since, Mr. Lane applied to the mine cage a safety device invented by Henry W. Bracken, then of Virginia, Nev., but now a resident of this city; and in order to prove its efficiency, put it to some pretty severe tests. Mr. Lane showed his faith in the merits of the appliances by standing on a loaded skip in the shaft when the connection was let go, by cutting the rope or unditching the hoisting reel. In each case, perfect success was the result. The sudden drop was instantly checked by the prompt action of the safety device clutching fast and immovably to the guides on each side. In this, Mr. Lane took the same chances for death as he fell those unfortunate miners in this same shaft a few months before. He took the same chances of similar horrible accidents that have occurred in the Trojan, Imperial, Tioga, Sharon, St. Lawrence and many other mining and elevator accidents.

The novel feature of this safety clutch is that it is independent of the cable altogether, and is attached to the bottom of the cage. The safety clutches are actuated by the pressure of air upon air wings or arms, which receive the pressure of the air in the shaft, thereby operating the clutch. The frame is formed of iron, and the wings of light sheet metal inserted in axles, and a housing of sheet metal, sufficiently strong to hold the pressure of air. In any rapid descent of the cage in the shaft, the air is met directly by the wings. These wings then rise, revolving the dogs and causing them to clutch the guides. This device can be adjusted so as to descend by a limited speed, and will stop a fall as readily from an unlatched reel as from a broken rope over or under a sheave. Thus, any undesired rate of speed will cause it to instantly clutch the guides and hold the cage. The operation is so immediate that there is no opportunity for the cage to attain a speed sufficient to break the clutches or tear out the guides. This is a new principle in cage safeties, and it has proven satisfactory at the Utica mine.

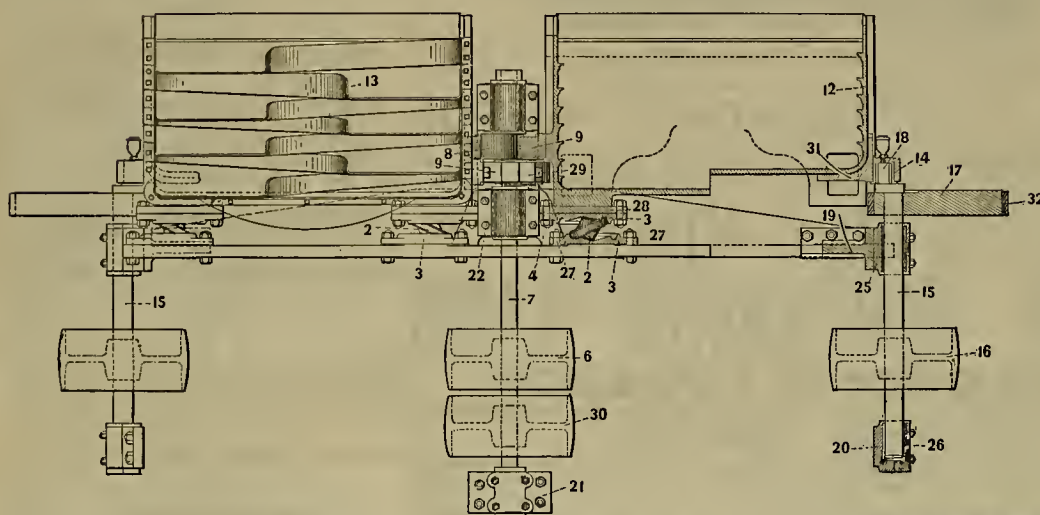
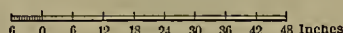
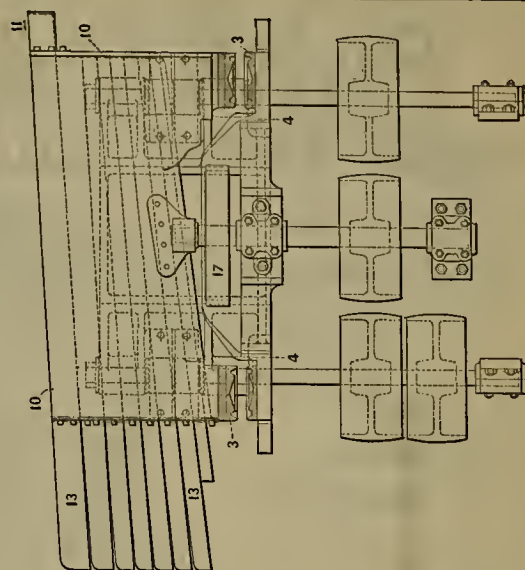
The San Francisco Delegates.

At the request of the Miners' meeting, held in this city, the Mayor of San Francisco has appointed as delegates to the State Mining Convention the following gentlemen:

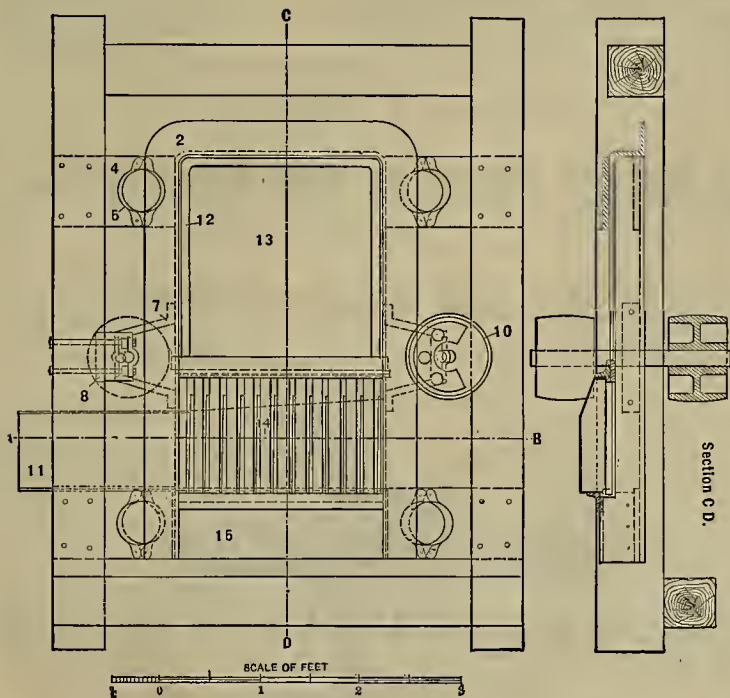
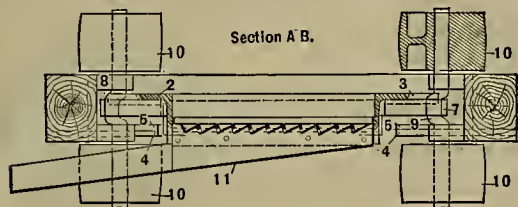
Jno. Hays Hammond.	Luther Waggoner.
Thos. K. Church.	E. Charonak.
W. S. Hobart.	W. C. Ralston.
Ross E. Browne.	Chas. S. Wieland.
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J. K. Thornton.	J. O. Whitney.
E. P. Marcellus.	J. C. Stump.
Geo. W. Grayson.	Philip Doideshelmer.
Thos. Price.	S. E. Holcombe.
Columbus Waterhouse.	J. H. Thomas.
E. Wheaton.	L. P. Drexler.
W. August Knapp.	F. Reischling.
Wm. Young.	J. S. Robinson.
Wm. Irelan, Jr. (State Mineralogist).	Simon Foreman.
J. M. Adams.	J. C. Rued.
J. D. Fry.	George Cox.
R. B. Pond.	Almarie B. Paul.
Robert Sherwood.	Henry G. Haaks.
M. W. Belshaw.	Jno. W. Coleman.
Francis Smith.	Thos. Brown (Bank of California).
Sam'l P. Pentis.	Wm. S. Lyle.
Felix Chappellett.	Egbert Judson.
A. J. Bowie.	J. L. Flood.
C. A. Luckhardt.	Jas. G. Fair.
Thos. Bell.	Paris Kilburn.
J. B. Randol.	E. C. Everson.
Jno. Treadwell.	Albert P. Brayton.
Sam'l J. Hendy.	John McNally.
F. Formhals.	

All of these gentlemen are either mine owners or in business directly connected with the mining interests. The names were selected only after careful consideration. Many others were suggested as prominently identified with the mining industry, but were omitted from the list mainly because it was desired to have as delegates only those persons who would give personal attention and time to the meetings. There are in the city numbers of men who have made fortunes out of mining, but having those fortunes, do not take the direct interest in the industry they formerly did, and leave others to do the work. For this reason some names expected among the delegates will not be found there.

The delegation meets this week to permanently organize, appoint committees, hire the hall, and make the necessary arrangements for the State Convention, which assembles Jan. 20.



Coal-Separating Machinery.



GYRATING SEPARATOR FOR SLATE OR COAL.

from this slate picker goes to one of the jigs, and by jigging, all the heavy slate is taken out. The material coming from the jig then passes over a small gyrating separator, K_1 (see engraving). This is a single gyrating table, the upper part (13) being a perforated plate with holes punched in it so as to remove any pea coal that may have got into the chestnut or may have been formed in it when it is passing through the jig, while (14) is a slate picker so arranged that the slate will only let out coal or slate too flat to go into the chestnut coal. This table which is made of angle-iron, is supported on four conical plates, the throw of which is two inches. It is counterbalanced by the four pulleys (10), when the stuff comes from the jig it passes into (13); the pea coal goes out, the coal, which is large enough for chestnut coal, passes over (14) and the finer stuff passes out through (11). The stuff passing over (15) is examined, and if there is still any slate in it, this is taken out, while the part which passes out through (11) goes to the small rolls, the slate, if in considerable quantity, being removed by hand before it is broken.

Academy of Sciences.

The annual meeting of the California Academy of Sciences was held on Monday evening last. The reports of officers and orators of the different departments were read and placed on file. Chas. F. Crocker, president of the Board of Trustees, reported that since the opening of the new building, \$22,406 had been received from rents. The society is, however, in debt to the amount of \$400,000, the sum borrowed from the Lick Trust for the erection of the building. The Academy is one of the residuary legatees under the James Lick Trust. A much larger amount than this will come to it in due time.

The museum of the Academy is now in condition for inspection, and many important acquisitions have been received during the past year. The Crocker-Stanford collection, purchased from Ward of Rochester and presented to the Academy, is at last in presentable shape, where the public can see it. It has been stored away for many years, in default of a place of exhibition. The museum is now quite creditable in appearance, and should continue to grow rapidly. People have hesitated to donate many articles of value which would have otherwise come to the institution, because the collection was not properly displayed. Under the present conditions, however, there is no reason why many articles in private hands should not be placed in the Academy collection, which is open to the public.

It is not pleasant to note, however, that the Academy is losing rather than gaining members. They only elected five new ones in the past year, while three have resigned, five have been dropped from the rolls and 11 have died. With a fine new building, good library and museum, the Academy should greatly increase its membership.

The election of officers resulted as follows: President, H. W. Harkness; First Vice-President, H. H. Behr; Second Vice-President, J. G. Cooper; Corresponding Secretary, Frederick Gntzko; Recording Secretary, J. R. Senham; Treasurer, L. H. Foote; Librarian, Carlos Troyer; Director of Museum, J. Z. Davis; Trustees—W. C. Burnett, Charles F. Crocker, D. E. Hayes, E. J. Molera, Geo. O. Perkins, Adolph Sntro, John Taylor.

The following honorary members were also elected: Otto Stoll, Zurich, Switzerland; Soreno Watson, Cambridge, Mass.; W. H. Brewer, New Haven, Conn.; Geo. L. Goodale, Cambridge, Mass.; J. A. Allen, New York City; Wm. E. Ritter, Berkeley, Cal.; Dr. Herman Graf Von Lambach, Strassburg.

The machinery necessary to separate coal from slate, etc., and size it at a mine or breaker must be so constructed as to handle large quantities rapidly. Several forms of these machines have been illustrated in late numbers of the PRESS, taken from Mr. Cox's paper on the "Iron Breaker at Drifiton." On Dec, 26, was given a general view of a double gyrating screen for sizing coal. On this page is given a plan, front and side elevation of this machine, from which its operation may be clearly understood by coal miners. In this some nine sizes of coal can be made in one box.

Referring to the ent, 2, represents the gyrating cones; 3, cone tracks; 4, front and back bedplate castings; 5, connecting box-castings for bedplate; 6, middle balance pulley; 7, vertical eccentric shafts; 8, eccentric; 9, eccentric pedestal; 10 screen box; 11, receiving lip (on back end); 12, jacket supports; 13, discharge lips (front); 14, hushing over orank pin on slide balance shaft; 15 and 16, slide balance shaft and balance pulley; 17, counterbalance; 18, orank pin on counterbalance shaft; 19, slide bed plate braces; 20, step pedestal on counterbalance shaft; 21, step pedestal on eccentric shafts; 22, upper eccentric shaft pedestal caps; 23 and 24, outer and inner laps of balance belt; 25, upper balance shaft pedestal; 26, step pedestal cap; 27, cone track bolts; 28, face plates on bottom of screen boxes for cone tracks; 29, eccentric pedestal caps; 30, driving pulley; 31, balance orank pin pedestal; 32, wrought-iron straps enveloping counterbalance.

The gyrating separator shown on this page is another form of machine. One of the great troubles in chestnut coal is the flat slate and flat coal which it is difficult to remove. We have, therefore, placed upon the main gyrating screen a chestnut slate plucker with a slit larger than would be economical, if it were to be used in the ordinary way. This slit is so large that it is almost certain to take out all the flat slate and a certain portion of coal which, though flat, is marketable. The whole mass that comes

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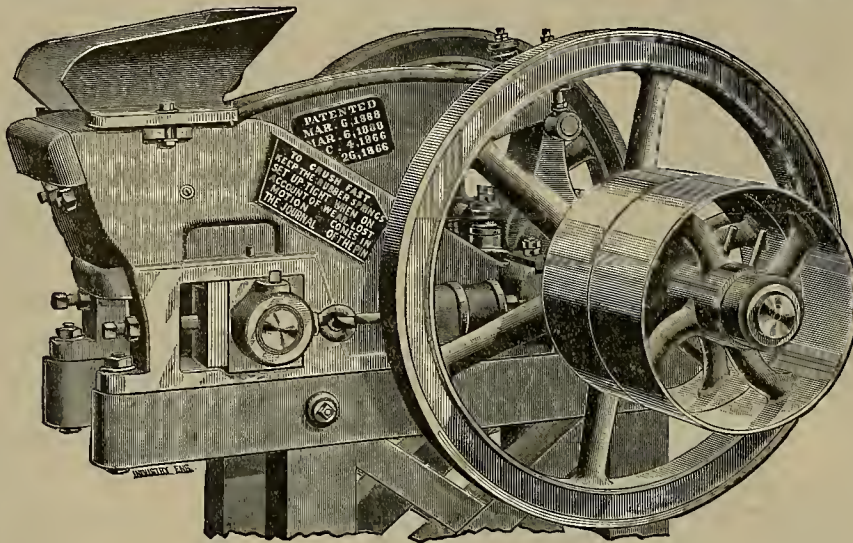
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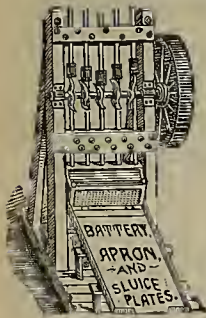
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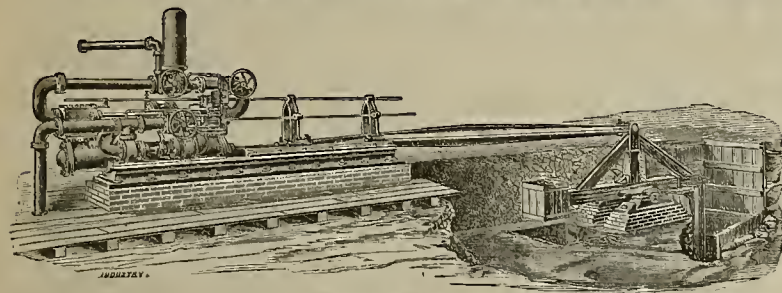
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Improvement of Navigable Rivers.

The California River Improvement Convention will meet in Sacramento on the 15th inst. Two years ago this same body met and sent a committee to Washington to appear before the River and Harbor Committee of Congress and urge an appropriation for the main rivers of this State. As no detailed plans or estimates had been submitted by the Engineers Department of the Government, nothing came from the committee labors except an order for the subject to be reported on by the engineers. The Board appointed went over the ground and studied up the subject, finally reporting the general plans of improvement decided upon.

Under previous laws, there was in existence a similar Board of Engineers, charged with the duty of examining and reporting upon the mining debris problem, and these two Boards of Engineer officers in charge of that specific work in California recommended an appropriation and an expenditure of more than \$720,000 for the improvement and protection of interior navigation in California.

Now the officers of the River Convention desire that Congress shall make the appropriations recommended by the engineers. It is the intention of the members to send a committee to urge the matter.

Among the specific appropriations asked for are these:

First—A permanent yearly appropriation, not to exceed \$25,000 for the improvement and conservation of the channels and banks by the use of a snag boat and crew on the Sacramento river, above the city of Sacramento.

Second—A specific appropriation of \$275,000 for the removal of obstructions in the lower Sacramento, and \$25,000 for the closure of Jacobs slough on the east bank of the Sacramento river, above the city of Sacramento.

Third—A specific appropriation of \$300,000 for the improvement of the Yuba river, near and above Marysville, and to retain the mining debris there.

Fourth—A specific annual appropriation of \$20,000 for the improvement of the navigable channel of the Feather river.

Fifth—An appropriation of \$136,750 for the San Joaquin river.

There should be no antagonism between this convention and that of the miners, which meets a few days later. The debris from the mines has undoubtedly injured the rivers in the past, but if present suggestions are carried out, this cannot occur again. Both bodies have demands in common; for the miners want the appropriations for the rivers, so that the lighter material which the dams will not hold back, can be oared for by the streams without doing any damage.

A Natural Sulphide of Gold.

The existence of gold in the form of a natural sulphide, in conjunction with pyrites, has often been advanced, theoretically, as a possible occurrence, but up to the present time this occurrence has, I believe, never been established as an actual fact. During my investigations on the ore of the Deep Creek mines, New South Wales, I have found in them what I believe to be gold existing as a natural sulphide. The description of this ore will, no doubt, be of interest to your readers.

The lode is a large, irregular one of pure arsenical pyrites, existing in a felsite dyke near the sea coast. Surrounding it on all sides are siliceous schists, and in the neighborhood is a large hill of granite about 800 feet high. In the lode and the rock immediately adjoining it are large quantities of pyrophyllite, and in some parts of the mine are deposits of this pure white translucent mineral, but in the ore itself it is a yellow and pale olive green color, and is never absent from the pyrites.

From the very first I was much struck with the exceedingly fine state of division in which the gold existed in the ore. After roasting and very carefully grinding down in an agate mortar, I have never been able to get any pieces of gold exceeding one-thousandth of an inch in diameter, and the greater quantity is very much finer than this. Careful dissolving of the pyrites and gangue so as to leave the gold intact failed to show particles of any larger diameter. As this was a very unusual experience in my investigations on many other kinds of pyrites, I was led further into the matter. Ultimately, after a number of experiments, there was nothing left but to test for gold as a sulphide.

Taking 200 grains of pyrites from a sample assaying 17 ounces of gold per ton, grinding it finely and heating for some hours with a solution of sodium sulphide (Na_2S_3), on decomposing the filtrate and treating it for gold, I got a result at the rate of 12 ounces gold per ton. This was repeated several times with the same result. This sample came from the lode at the 140-foot level, while samples from the higher levels, where the ore is more oxidized, although carrying the gold in the same degree of fineness, do not give as high a percentage of auriferous sulphide.

It would appear that all the gold in the pyrites (and I have never found any apart from it) has originally taken its place there as a sulphide. The following is an analysis of a general sample of the ore: Silica, 13.940%; alumina, 6.592%; lime, 0.9025%; sulphur, 16.584%; arsenic, 33.267%; iron, 27.720%; cobalt, 0.964%; nickel, traces; gold, 5 ozs. 3 dwts. 8 grs. per ton; silver, 16 dwts. per ton; total, 99.969%.—T. W. T. Atherton, in Eng. and Mining Jour.

List of U. S. Patents for Pacific Coast Inventors.

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FOR THE WEEK ENDING DEC. 29, 1891.

466,146.—BOW FOR STRINGED MUSICAL INSTRUMENTS—Ayres & Schroeder, Whipple, Barracks A. T.

466,214.—INSTRUMENT FOR MEASURING THE UNITS OF WORK DONE BY MACHINES—H. C. Behr, S. F.

466,014.—NUT LOCK—Brasaban, Richardson & Frischi, Suisun, Cal.

466,075.—WRAPPING MACHINE—W. A. Brown, S. F.

466,063.—ELECTRIC ANNUNCIATOR—F. C. Colville, Oakland, Cal.

465,974.—LOCK—H. Elliott, Los Angeles, Cal.

466,231.—VALVE FOR HYDRAULIC ELEVATORS—C. I. Hall, S. F.

465,861.—FIRE EXTINGUISHER—C. D. Harsin, Stockton, Cal.

465,929.—STEAM BOILER—A. Heberer, Alameda, Cal.

466,237.—MOTIVE ENGINE—J. L. He derson, Alameda, Cal.

466,073.—TRUCK—Hunt & Ball, Winters, Cal.

466,074.—MEMORIAL BURIAL TABLET—J. W. Hunt, Kirby, Or.

466,170.—METALLIC PACKING—Kilborn & Young, Oakland, Cal.

465,987.—CAR COUPLING—John C. Look, San Jose, Cal.

465,878.—DUMPING TRAP—C. D. Page, Tacoma, Wash.

466,256.—VINEYARD BRUSH BURNER—Jas. Porteous, Fresno, Cal.

465,979.—ORE CONCENTRATOR—G. E. Woodbury, S. F.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

TRUCK.—Cbas. R. Hunt and Thos. D. Ball, S. F. No. 466,073. This is one of that class of appliances which are provided with mechanical power devices for facilitating the loading thereof. The invention consists, in connection with a vehicle, of an independent movable frame thereon and roller interposed which bear and travel on inclined planes, whereby, through the movement of the frame, it is lifted and lowered by the rollers. The object of the invention is to provide a simple, easily-operated and powerful means for lifting a load from a fixed stand on which it is preliminarily placed, and transferring it to and bearing it upon a vehicle by which it can be transported.

MEMORIAL BURIAL TABLET AND INDICATOR.—Johnathan W. Hunt, Kirby, Josephine Co., Oregon. No. 466,074. Dated Dec. 29, 1891. This relates to what the inventor terms a memorial burial-tablet, witness-pin or indicator, and receptacle. It consists of a tablet made of indestructible material, said tablet being buried beneath the soil of the grave, and in conjunction therewith of an indicator or pin, which shows the location of the tablet and at the same time serves to support a receptacle for flowers or other articles. The object of this device is to provide a suitable means for identifying any grave from which all external marks may have been destroyed, and as the tablet contains all the necessary inscriptions, and the pin points to its position, it will be easy at any time to identify the grave and know who has been buried in it.

VINEYARD BRUSH BURNER.—James Porteous, Fresno. No. 466,256. Dated Dec. 29, 1891. The implement is intended for the disposal of brush in vineyards. This brush, which consists in the numerous and extensive cuttings made every year, is somewhat difficult to dispose of, the usual method being to take it together in piles and either carry it off or burn it. It cannot be left on the ground as brush, because it is in the way of the cultivating implements. This new implement consists of a peculiarly formed furnace, mounted on wheels and made narrow enough to work easily in, and to travel through, the rows of vines. The brush is picked up and thrown into the furnace, and as it is burned up, the air holes below furnish ventilation, so that a thorough combustion takes place, and the same holes provide for a discharge of the ashes, which serve to enrich the ground. The novelty in the implement and the principle portion of its utility lie in the shape of the furnace. It is made with a wide top, so that the sticks thrown into it will not fall out. This is of great importance, not only in saving trouble in picking them up again, but more especially in preventing charred sticks from falling upon the ground. The furnace is made tapering, so as to remove its heated walls as far as possible from the vines. When burning brush openly between the rows, it is the practice to protect the vines by covering them; but with this device, this is unnecessary.

WRAPPING MACHINE.—Wm. A. Brown, S. F., assignor of one-half to Arthur G. Towne. No. 466,075. Dated Dec. 29, 1891. This invention relates to that class of machines for wrapping parcels of all kinds, and especially for wrapping packages of bags. The object of the invention is to provide a simple and effective machine for tightly compressing the parcel within the partially-surrounding wrapper, until said wrapper is properly pasted or otherwise secured, and then relieving said wrapped parcel.

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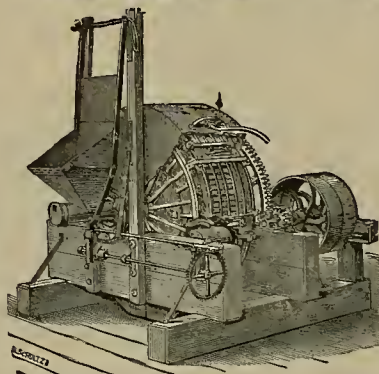
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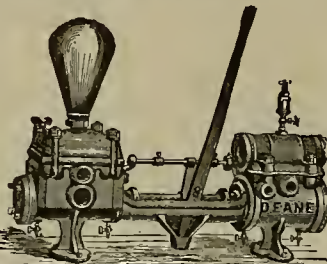
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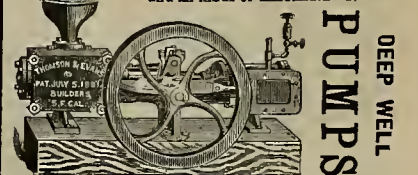
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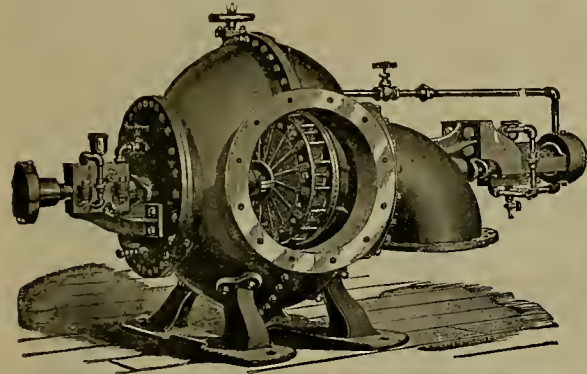
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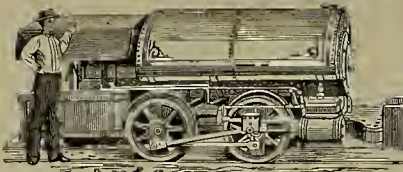
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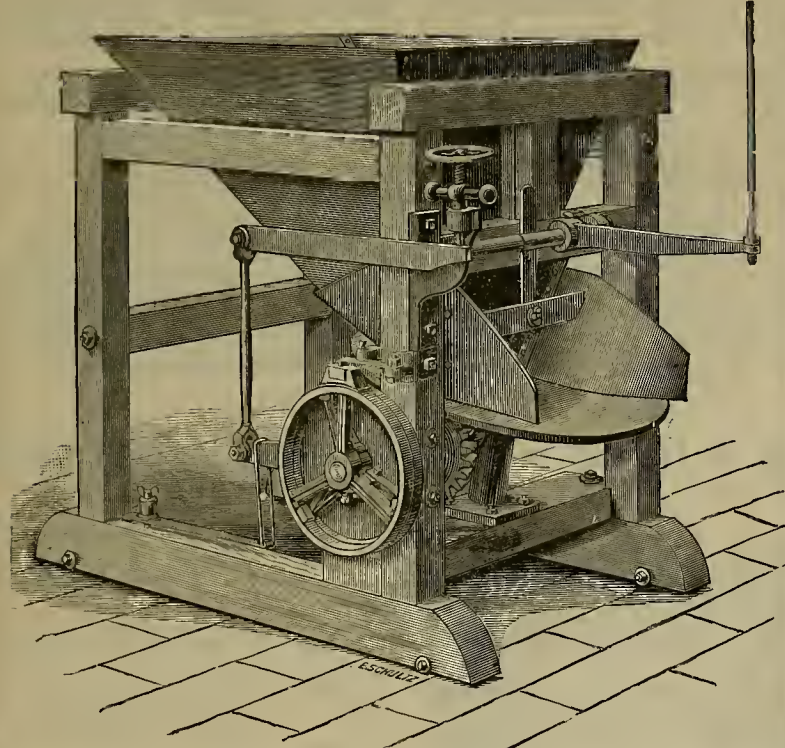
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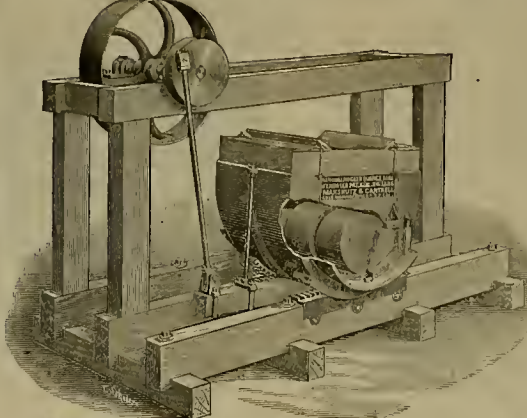
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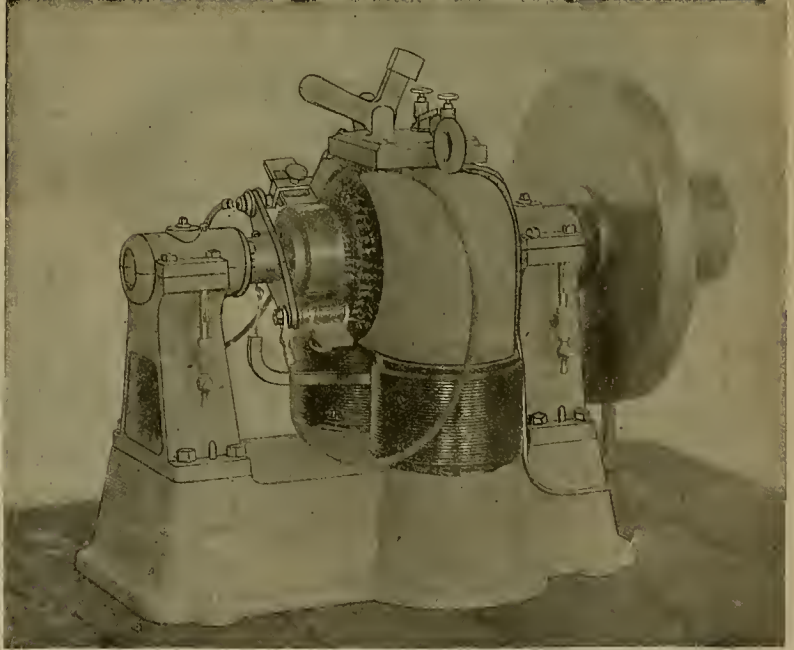
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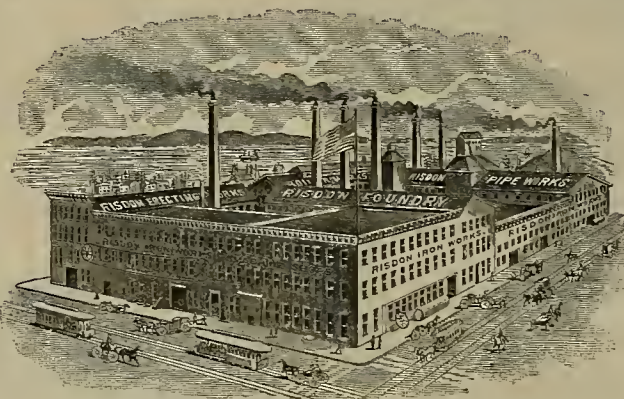
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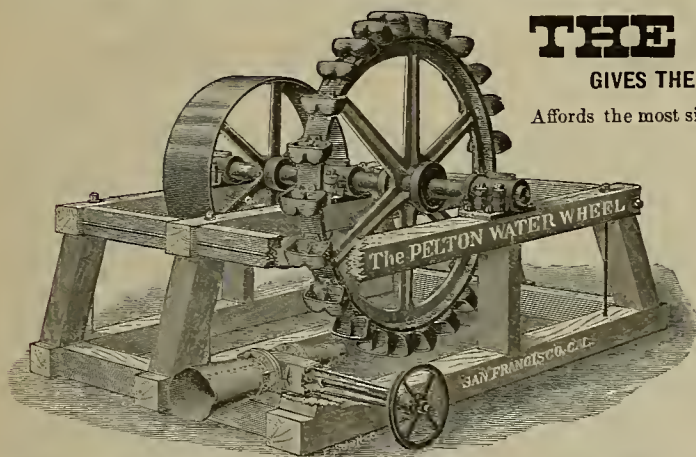
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121-123 MAIN STREET, SAN FRANCISCO, CAL., U. S. A.
143 LIBERTY STREET, NEW YORK, U. S. A.

PELTON WATER MOTORS. Varying from the fraction of 1 up to 40 and 50-horse power, unequaled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. Address as above.

THE GATES ORE AND ROCK BREAKER.

UNLIMITED IN CAPACITY UNEQUALED IN EFFICIENCY. UPWARD OF 3,000 NOW IN USE. Will do more than twice the work of any other with the same cost in wear. Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

If having come to the notice of the undersigned that their patent rights are being infringed upon, intending purchasers are hereby warned that all such infringements will be duly prosecuted. (Signed) THE PELTON WATER WHEEL CO.

THE PELTON WATER WHEEL CO. 121-123 Main Street San Francisco, General Western Agents.

"RED FLAX CORD"



SQUARE FLAX PACKING.

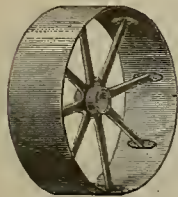
MANUFACTURED FROM STRICTLY FIRST-CLASS FLAX AND PURE LUBRICANTS. HAS NO SUPERIOR for all Hydraulic Work.

W. T. Y. SCHENCK—Dear Sir: We find your "Red-Cord" Square Flax Packing the "Boss." Yours truly, J. B. LANE, Secretary.

The red cord runs the entire length. Put up in boxes of 20 feet, or coils of 60 to 80 lbs. For sale by all

W. T. Y. SCHENCK, Sole Manufacturer, 222 and 224 Market Street, San Francisco, Cal.

PERFECT PULLEYS



First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

MEDART PATENT WROUGHT RIM PULLEY

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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DEWEY & CO. { 220 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front.

ESTABLISHED 1866.

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HENRY G. HANKS,

Practical and Industrial Chemist, Assayer and Geologist.

718 MONTGOMERY ST., - SAN FRANCISCO.

Will report on the condition and value of any mining property on the Pacific Coast. Rare Chemicals made to order. Instructions given in Assaying and Practical Chemistry



STAMP SHOES.



STAMP DIES.

Adamantine Shoes and Dies

CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

THESE CASTINGS ARE EXTENSIVELY USED IN ALL THE MINING STATES and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

H. D. MORRIS, Agent, 220 Fremont St., San Francisco.

Special attention given to the purchase of Mine and Mill Supplies.

Stamp Cam.

FRUE ORE CONCENTRATOR

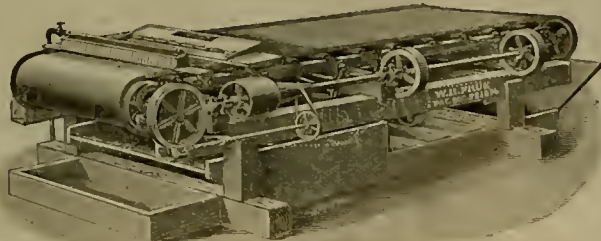
OVER 3000 IN ACTUAL USE.

We are now manufacturing these machines in different styles. The regular Four-Foot Plain Belt Frue Vanner is on the market now in its latest and most improved form, having several improvements on it that facilitate the work, altogether making it a perfect machine.

We are also manufacturing a Four-Foot Frue Vanner with a belt having an improved surface which doubles its capacity. This machine is as perfect in every way as the regular machine, and with its improved belt, it has double the capacity of the ordinary machine. We have sold a large number of these machines, and have demonstrated that they are a success.

The above figures of the number of machines that we have sold tell the tale of their popularity, and show that they have made their reputation by doing their work perfectly.

For any further information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.



Manufactured under Patents of April 27, 1880;

September 18, 1883; July 24, 1888;

and March 31, 1891.

Price of Plain Belt Frue Vanner, \$575, f. o. b.

Price of Improved Belt Frue Vanner, \$825, f. o. b.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., No. 132 Market Street, San Francisco, Cal.

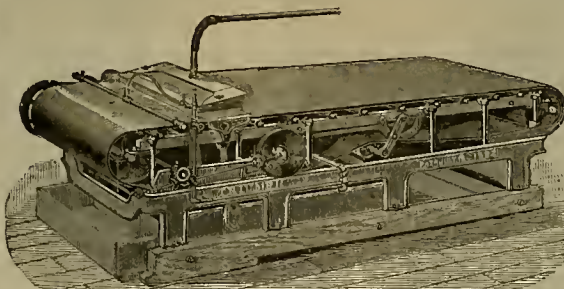
"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.

Price "Triumph" Concentrators, with Plain Belt - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.

GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1886.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

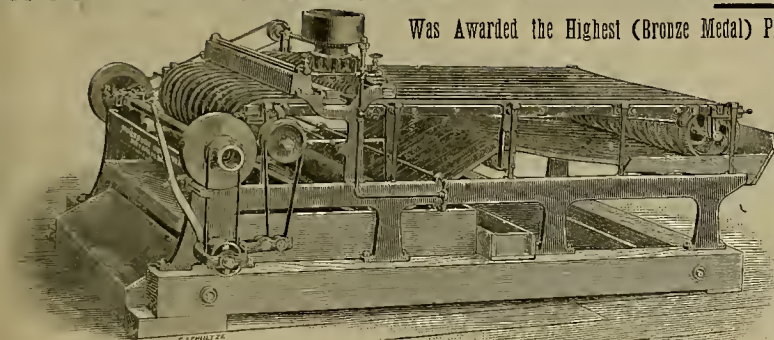
GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.

Signed] Sup't North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

Was Awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891.

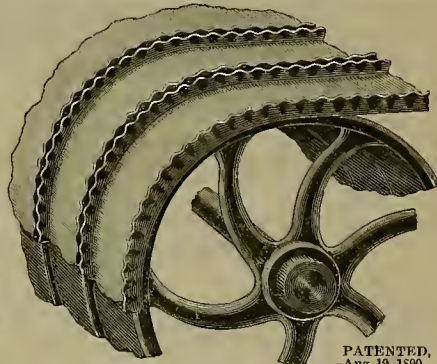


More than Double the Capacity
With One-Half Less Power and Occupying Less than
One-Half the Space of any other Concentrator.

Built of Best Steel and Wrought Iron.
STRONG AND DURABLE.

Price.....\$575 f. o. b.
Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. This excess in length of material effectually prevents the edges from cracking; plain edge belts have to stretch about one inch to the foot as they pass around the drums. This continuous stretch cracks the edges. The improved belt obviates that difficulty.



PATENTED,
Aug. 19, 1890.

GEO. E. WOODBURY, Man'r, 213 to 219 First St., San Francisco.

CALIFORNIA CONCENTRATOR. Write for Circulars.

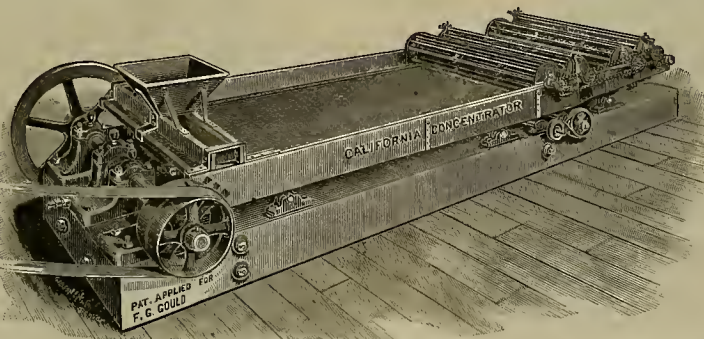
New Departure in Concentration.

Is Not 20% Being Lost from Your Mill
in Fine Gold and Sulphurets.

SUCCESSFUL INTRODUCTION IN IDAHO,
MONTANA AND COLORADO.

Large Capacity, 20 to 40 Tons.

Write for Circulars. Space used..... 6 x 13.
Horse-Power..... 5.



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MADE BY CAL. MFG. CO.,

Composed of Practical Mining Men and Experts in Concentration and Milling.

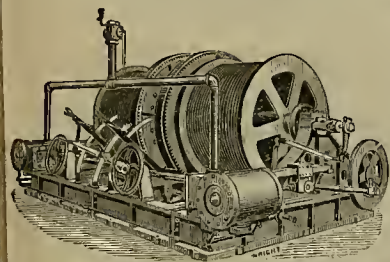
A new principle and a range of adjustment to suit any ore.

No competition with any other machine but an addition.

California Mfg. Co.,

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1, 2, or 4 Drums, with Reversible Link
Motion or Pat. Improved Friction.

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For information concerning this process for the reduction of Ores containing precious metals, and terms of license, apply to

THE RUSSELL PROCESS CO.,
Park City, Utah.

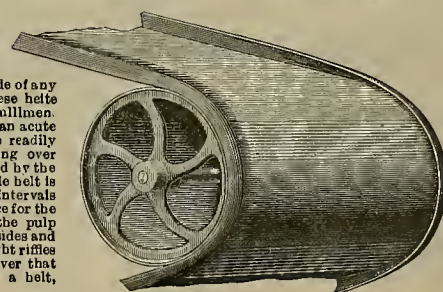
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Constantly on hand a full assortment of Manila Rope, Duplex Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice,
611 & 613 Front St., San Francisco, Cal.

THE BLASDEL CONCENTRATING BELT COMPANY.

We have now made arrangements to have our new Concentrating Belt manufactured in San Francisco; we can therefore fill all orders on short notice. The length and width of these belts are the same as is used on the Frue or Triumph Concentrating Machines, but can be made of any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen. First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight ruffled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight ruffles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth.

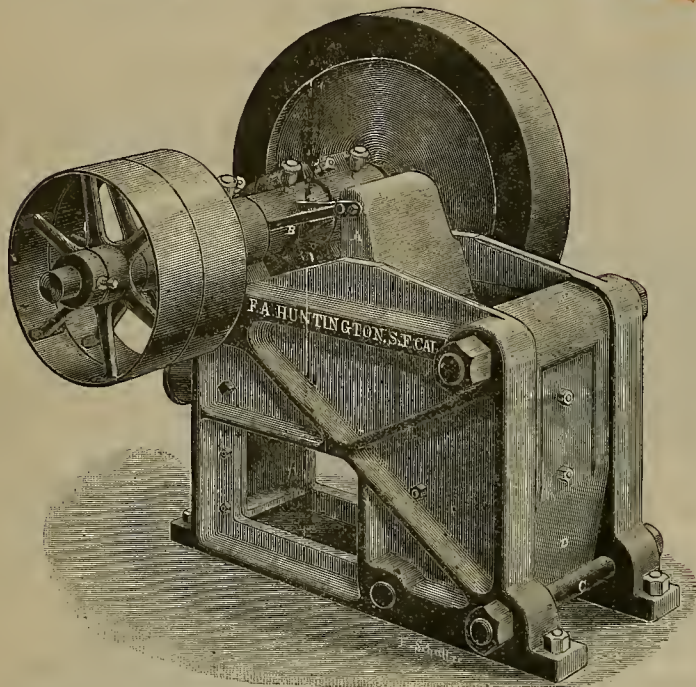


H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.

F. A. HUNTINGTON,

— MANUFACTURER AND DEALER IN —

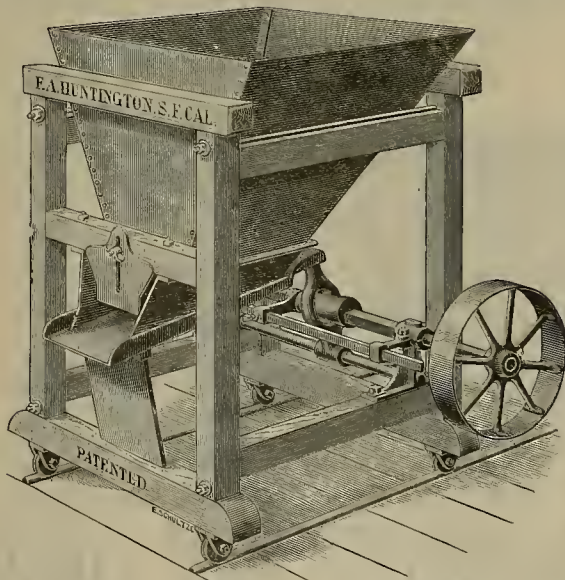
MINING MACHINERY.



HUNTINGTON'S IMPROVED ROCK-BREAKER.

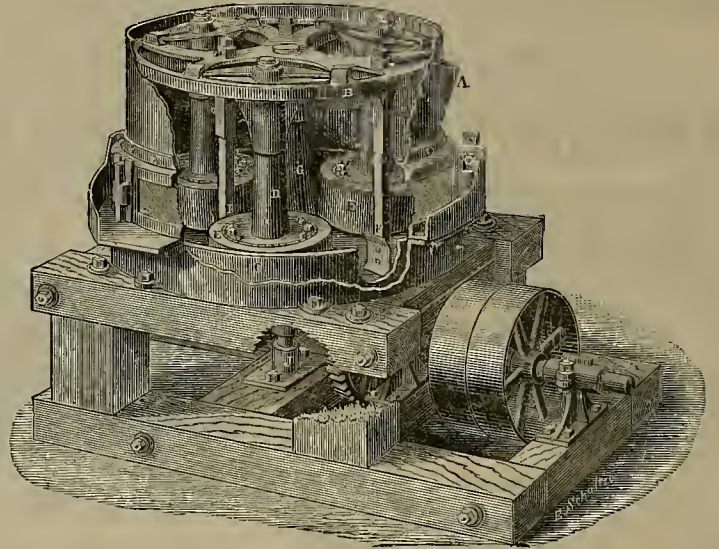
The Main Features of this Machine are Strength, Ease of Adjustment, and Simplicity of Construction.

The movable jaw A is worked by the eccentric B and is pivoted at the bottom. The stationary jaw D is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt C. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt C and the jaw D. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



HUNTINGTON'S PATENT ORE FEEDER.

This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.

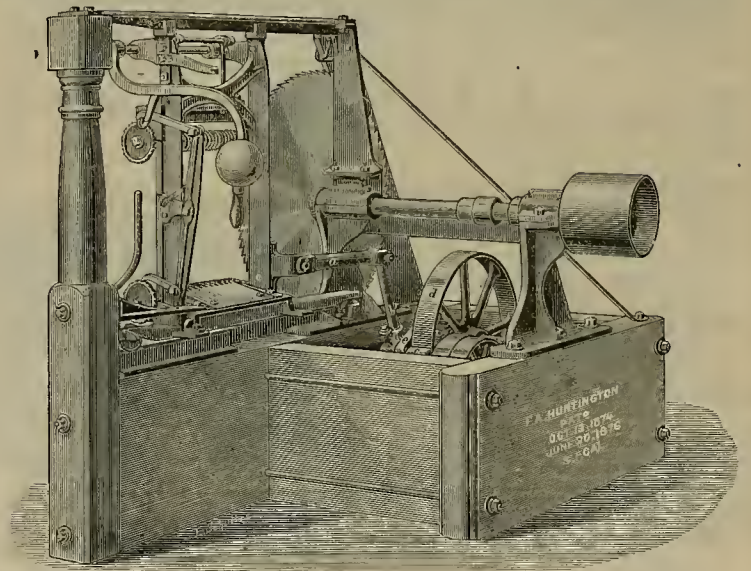
The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet-crushing and gold-saving it has no equal.

I CLAIM ESPECIAL MERIT IN THAT FEATURE OF THIS SYSTEM WHICH PREVENTS ALL FLOURING OF GOLD AND QUICKSILVER, and the consequent loss of gold that attends stamp-milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.



F. A. HUNTINGTON'S PATENT SHINGLE MACHINE.

This machine is so well and favorably known by all the principal lumbermen on the Pacific Coast that it is useless to go into any detailed account of its merits; suffice it to say that recent improvements in a new, quick return feed-works has placed it far ahead of all competitors. Send for Circulars.

F. A. HUNTINGTON,

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STEAM ENGINES AND MINING MACHINERY OF EVERY DESCRIPTION.

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VOL. LXIV.—Number 3.
DEWEY PUBLISHING CO.

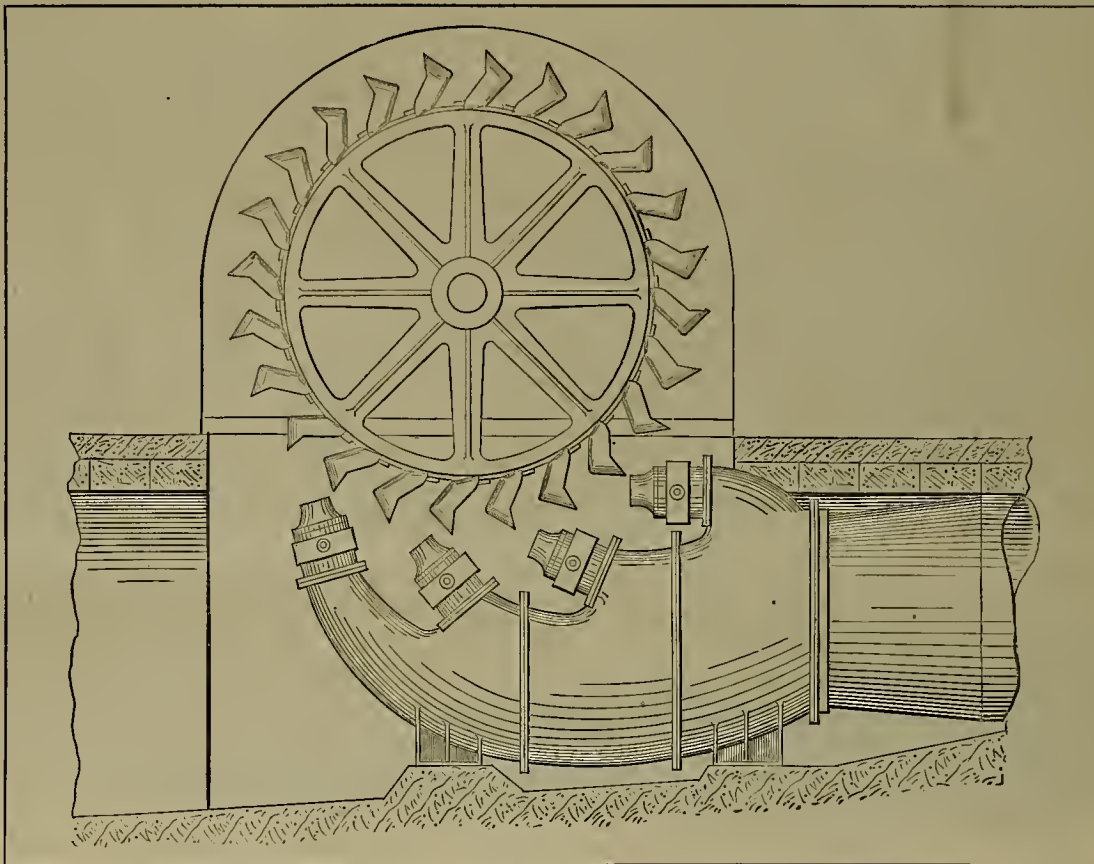
SAN FRANCISCO, SATURDAY, JANUARY 16, 1892.

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SINGLE COPIES, 10 CENTS.

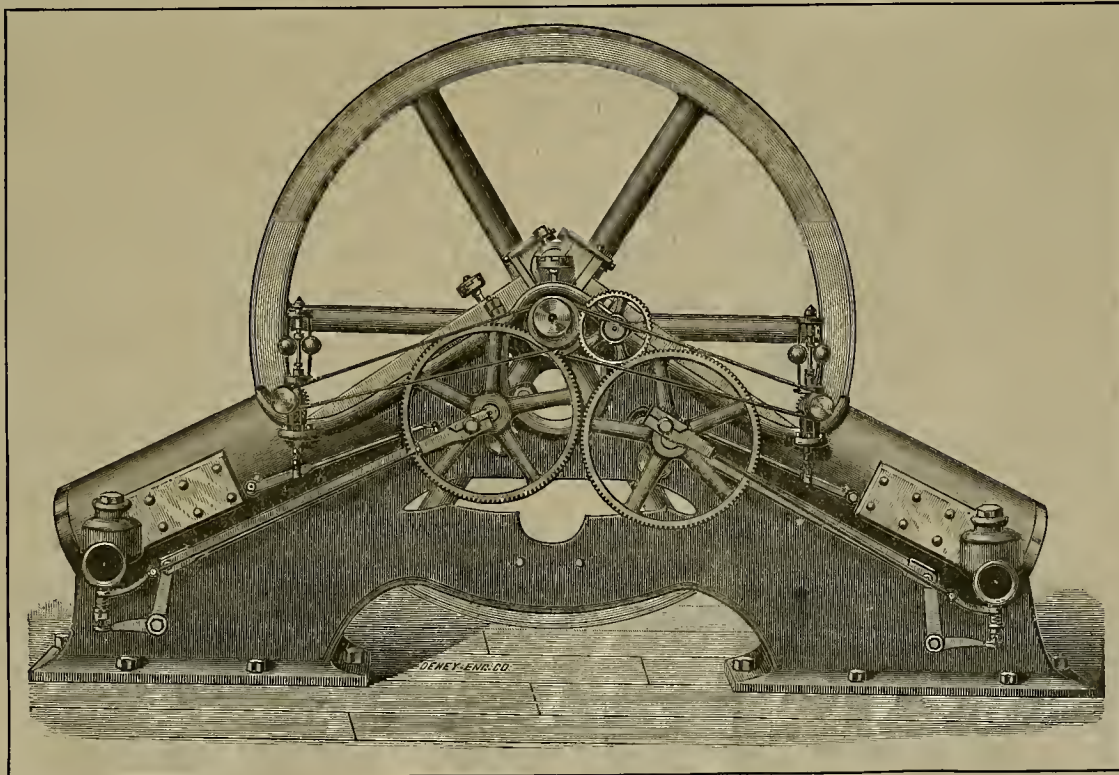
The Best Duplex Vapor or Gas Engine.

The accompanying cut represents a duplex gas or gasoline engine manufactured by Daniel Best of San Leandro, the noted builder of traction engines, steam harvesters, etc. Mr. Best exhibited a single cylinder engine of this type at our late State Fair, and also at the Stockton Fair, and after a very careful Prony brake and gas meter test, was awarded the first premium. An engine like the one shown in the cut is now doing work on a "motor car" on the San Jose and Alum Rock street railway. The cylinders of these engines are 8"x16", and when the engines are running 300 revolutions per minute, are claimed to develop about 18-horse power. This motor car has made 14 miles per hour, hauling a loaded gravel car both ways over the line, which is some four miles long. A six days' test of the motor car shows a consumption of about six gallons of gasoline per day of ten hours, when the car is running at an average speed of eight miles per hour, and about ten gallons per day, when the speed is increased to 14 miles per hour. To keep the engines cool, about 60 gallons of water are required. This water is stored in a tank on top of the car, and there is a loss by evaporation of about five gallons per day.

This may seem a strange statement to those not acquainted with the construction of the engine; but the electrical sparking device, which ignites the explosive gases in the cylinders, is so constructed that it is not injured by even a very high degree of heat, and the high efficiency of the engine is perhaps due to this fact, for it is well known that if the cylinder of a gas engine can be safely kept at a reasonably high temperature, the explosive gases confined therein will exert a greater force when exploded than they would if cold. Mr. Best, in fact,



SYSTEM OF MULTIPLE NOZZLES FOR WATER-WHEELS.—See page 42.



BEST'S DUPLEX GAS ENGINE FOR "MOTOR-CARS."

claims this as one of the many strong points in his engine.

The speed of these engines is controlled by simple ball governors, which operate the sparking device. The explosions take place in the cylinders whenever the motion falls below the given number of revolutions desired—the range of the governors being from 150 to 300 revolutions per minute.

In running the "motor car" at San Jose, the engine is stopped on down grades and the cars run by gravity. When the car reaches the foot of the grade and begins to slow down, one or both of the engines are brought into action as may be required, and this by the movement of a lever while the car is running at full speed. The car will run backward or forward and is under as perfect control as a steam locomotive.

What the result of this new departure in motor cars will be, can easily be conceived. The gas or vapor engine has apparently come to stay, and is being used to propel pleasure boats and larger craft for commercial purposes. Numbers are employed in running printing presses, machinery, pumping water, etc. The successful application of the gas engine to urban and street railway work will largely assist in doing away with the use of animal power now so generally used. These engines require no skilled engineers to run them and are comparatively inexpensive to operate. Mr. Best, having made such a success of his traction engines and steam harvesters, is a good man to enter this new field of mechanical engineering.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Rehabilitate the Mining Industry.

A Plea for the Hydraulic Miner.

SAN FRANCISCO, Jan. 9, 1892.

TO THE EDITOR:—I want to say through your columns, to the miners of the State of California, that the time for action has come; let not your interests lie dormant any longer, but at once endeavor to redeem your former prestige, and bring to the front once more the leading industry of the State. Show the world that instead of our gold fields being exhausted (as many claim), that there is yet more gold in the ground yet than has ever been extracted. What is needed now, is to have the question settled as to the proper method of its extraction, without materially injuring other interests.

There have been so many bitter attacks made upon the miners of this State, on account of the filling of our water courses by debris, that it seems to be taken for granted that this filling is due entirely to the operations of the miners. The Anti-Hydraulic organs talk about land being destroyed by debris, and that no convulsion of nature could so destroy its usefulness, while the opposite view is maintained by those who have the proper facilities of knowing.

Take for instance the Cherokee Mining Co., which bought 28,000 acres of ground below its claims to be used as dumping grounds; the right to do which was denied the company on the ground that "the title to land does not carry with it the right to destroy the productive quality of the land."

The Cherokee Co. purchased land on Dry Creek, which was covered with debris, but now some of that land has been reclaimed and is now cultivated and producing good crops of wheat, equal to any in the adobe soil. From this it would appear that the land was not permanently ruined by silts, but after two or three years rest it becomes assimilated with the original soil and again becomes good farming land. In proof of this, a number of acres of this land was sown in wheat, which produced no less than 80 bushels to the acre. It is true lands are covered, levees have had to be built, and improvements have been destroyed. But the land so covered, again makes good and productive soil.

Is not the right to mine as well established as the right to farm? The miner must wash his ground; the farmer must plow his fields. Both are secured in their rights by custom and necessity, yet neither of them is by statutory laws. Now as to any written statute for the prevention of hydraulic mining there is none whatever, neither State nor United States.

The miner bought his land from the government of the United States and paid therefore at the rate of \$2.50 per acre. The farmer buys his at the rate of \$1.25 per acre. Now the question arises what does each party purchase the land for, if not for its respective use? Hydraulic mining is a legitimate and honorable industry, of great benefit to the State at large and upon which whole towns and thousands of workmen and their families depend for support, and it is unjust to crush it by injunctions issued by interested parties.

It not infrequently happens that private rights must give way to the public good, and it is a matter of fact that is indisputable that the sum of \$200,000,000 has been expended in this State by mining men and capitalists in the advancement of the industry they represent, in the purchase of lands, bringing in ditches (costing millions of dollars), and machinery to develop the golden resources of the State. All of this is now a dead loss, aside from the outlay of an annual output of from \$12,000,000 to \$15,000,000. It is enough to paralyze and bankrupt a nation, let alone a State.

Since the stoppage of hydraulic mining there have been thousands of men thrown out of employment and their homes and families made desolate and destitute. The interior towns have deteriorated in population, and lost all their trade, where once they did a large business in supplies for the mines; while the mining towns that contained from 500 to 3000 inhabitants, now in many cases, have been utterly wiped out.

What made this great and glorious State? What brought out our pioneers? Was it not the gold that all expected to realize? Has all the latter farming interests brought hither the same class of hardy, daring, self-reliant, brawny-armed men?

What has built up this great metropolis of the Pacific, and built our city from amid a barren sand waste? Look at every large and substantial structure of the times up to 1880 and the record will show that the investments were made almost entirely by those who had realized from the mines, even with all our great wheat products.

No damage has yet been done to San Francisco bay by mining operations, nor is there any possibility of its ever being done. Its great distance from the mines, an immense level plain intervening, renders it impossible for the detritus to be carried there but in solution. The destruction of the navigable rivers from hydraulic mining is also impossible. This industry does not increase the flow of water; on the contrary, it stores it during the flood season,

and adds materially to the flow at low water when it is most needed.

While on this subject, allow me to refer to the Congressional Committee which came out here to investigate the subject some years ago, when some of these Solons were made to believe that the black mud at Mare Island, in which the "Independence" was imbedded, was the result of silts from the mines, which would have to run up stream to get there. Now, any one knows that all mining debris is of a silicate nature instead of soil—or black mud.

By reference to the report of the State Engineer, Mr. Hall, made in 1880, we find that the Sacramento river transports each year about 18,000,000 cubic yards of earthy material, of which 13,200,000 yards come from the mines; the residue of 4,900,000 yards coming from other sources, resulting chiefly from agricultural disturbance of the soil. That is to say, farming operations are responsible for over 25 per cent of the present damage.

Able engineers believe fully in remedial measures, and their opinion is of great weight. If the calculations of engineers were true, the whole gravel grounds could be put in the Sacramento valley and it would not fill it two inches higher. From Marysville to Suisun bay is a distance of about 80 miles; assuming an average width of 40 miles, we have an area of 3200 square miles. To fill this area one foot in depth by the flow of mining debris would require 250 years of time.

Could the swamp lands along the Sacramento river be filled with this debris from five to ten feet in depth, thus building up firm and high ground, there would be ample room for all the material which may ever come from our mines.

A dam now stands across Bear river, near Colfax. It has stood the test for years and no flood can remove it.

A plan whereby the lighter portion of the washings from the mines could be brought down by means of flumes and deposited upon the tule lands of the water courses, and not only pay the cost of construction, but also reclaim millions of acres of land now and forever worthless, is thoroughly practical. It is only a question of means. The end is protection to the farmer and immunity to the miner. It is unjust to expect the miner of to-day to take care of the tailings of the early miner. The whole world has been enriched by his work, and it is not the duty of the Government to make a small expenditure to avert the injury resulting from it? Make the showing, and there will be no difficulty in getting the aid. Waste no more money and effort in a suicidal war on your friends. Unite with them for the common good. The only sensible course now is conciliation and compromise. If both sides will agree upon a system of damming and reclamation, Congress may be induced to aid in the clearing out or leveeing of the rivers. Otherwise, we need not expect much help from that quarter, and the game of outting each other's throat and liberally feeling the lawyers will go on. Had not this agitation been sprung originally by a legal light of the profession, for the purpose of his own pecuniary aggrandizement, the question would have been amicably and satisfactorily adjusted long since.

Gold regulates the commerce of the world and controls the destinies of nations. Had it not been for California's gold in the late struggles of our own nation, where would we have been? And now, in presenting our grievances to the Government and asking aid to help solve this question of the mining interests and output of the precious metal, we are merely asking a small favor in return for the one given in time of need.

And here let me add that in Judge Temple's decision, rendered in June, 1882, in the Dotch Flat case, the following passage occurs: "Subject, nevertheless, to this, that said defendants may at any time, as it shall be advised, apply to this court to have this decree and restraining order modified or vacated and set aside. And whenever, upon such showing, it shall appear that efficient means have been provided to impound, detain and hold back said tailings at any point on said American river above Alder creek, and that such means are sufficient to detain all boulders, cobblestones, gravel and the heavier sand, then said defendant shall be entitled to have said decree vacated and set aside."

His opinion is as follows: "I have concluded to so find that when the heavier debris is completely impounded mining may be resumed, virtually refusing to hold that the plaintiff may enjoin such operations as only corrupt the water with mud and render it less suitable for domestic and other uses. Perhaps I am somewhat moved to this by the consideration that otherwise mining can never be prosecuted at all. It will probably be impracticable to impound the lighter portion of the sediment. I confess I shrink from a consequence so far-reaching. It seems to be a conceded fact that this is not materially injurious either to navigation or the riparian lands. Counsel denied that there was any intention to assail the prosecution of drift, seam or quartz mining. There was no material injury from that source. The sediment from such mines is of the same character as the material which cannot be wholly impounded."

Therefore, I repeat that there is no legal statute upon the books to prevent hydraulic or any other species of mining.

"It is the duty of every citizen to lend his influence to consummate the desired end" in a fair and reasonable manner, which shall be just to both parties, and not by popular clamor, misrepresentation or snap judgment.

The only injunction that should be considered in the premises is the divine injunction, "Do unto others as you would have them do unto you." What is needed is joint action toward procuring Government aid in solving the problem, so that the hidden wealth of the hills may be taken out, and at the same time every foot of valley land may be saved or reclaimed for agricultural purposes.

In conclusion I would add, let us see every honorable means in our power to have this vital and most important question of the reopening of mines, brought to a speedy and at the same time, equitable, adjustment, restoring us to prosperity in all branches of industry, and adding millions annually to the nation's wealth; giving a new impetus to trade and commerce and furnishing to the world additional wealth, which otherwise must remain in nature's laboratory for all time, benefiting no one.

W. AUG. KNAPP.

Those Absurd Department Rulings.

LINCOLN, N. M., Jan. 2d, 1892.

TO THE EDITOR:—I note in your issue of the 26th ult., an editorial upon Mr. Asst. S. O. Chandler's decision in the case of Hay et al. vs. Kern et al., Sacramento Land District, Cal.

I am glad to note the growing disposition to contest in Congress the absurd and alarming rulings of the Department in relation to mineral lands and claims. As you very justly remark, Mr. Chandler has precedents (and a long line of them) for his decision but all of these decisions of himself and predecessors in office, are based upon profound ignorance of law, or upon bases still less creditable.

An experience of many years, in mineral practice before the local Land Office and the Department, has deprived me of the capacity of being surprised at any absurdity which the Department of the Interior and its officials may commit, and they habitually disregard Department precedents even, whenever by so doing they may oppress the mineral or coal claimant.

By the miners in various departments of that business, the West has been developed. True, California has a great reputation now, as an agricultural and horticultural State. Nevertheless, but for her stores of gold, and the gallant men who made them available, her agricultural and horticultural development would now have hardly been commenced, and the second half of the twentieth century would hardly have found the State where she is today. The same may be said of Colorado, N. M.; A. T. Utah, Nev., Montana and Idaho. But for the miners, the farmers in this region would have no available markets, and the lands would lie waste and unoccupied. In every other mining country, the miner is encouraged and receives in every practicable way, Government aid. In the United States alone, in the country which more than any other, is indebted to the mining fraternity, is the miner regarded by the petty officials of the Government as under a ban, and mining as an interest to be discouraged, by the interposition of every obstacle in their power to create.

I know very many cases of contest between agricultural claimants on the one hand and mining or coal claimants on the other, in which the land has been given to the agricultural claimant notwithstanding unquestioned proof that the land was prospectively valuable for mineral or coal, and that it was utterly worthless for agricultural purpose. I have known this to be the result even when it was in evidence that the agricultural (?) claimant had laid out the land in town lots, and only sought title for purely speculative purposes.

All familiar with the intentions of Congress in passing the mining statutes, know that such intentions were directly opposite to the practice of the Interior Department.

It is time that Congress made a declaration unmistakable in its terms, which shall bring these officials to their knees. And while about it, Congress should provide that under no circumstances shall officials of the Interior Department, take jurisdiction over contests initiated after final proof and sale of the land, as evidenced by a certificate of purchase. From that date the United States has no beneficial interest in the land, and holds nothing but the dry, naked legal title in trust for the purchaser. And yet the land of thousands has been stolen from them by the decisions of Interior Department officials, after sale of the land and the receipt by the United States of the price. If any mistake has been made, or fraud committed in the premises, the courts are open to the United States or to any one having in equity a claim upon the land, and to the courts they should be referred. At least the courts alone have any lawful jurisdiction in the premises. Our people should be far more jealous than they are of the jurisdiction assumed by departments of the Government, and especially by the Department of the Interior, to control the operation of positive law by the operation of so-called "regulations." As often exercised, it amounts to tyranny pure and simple, and may always become so. It is safe to say that no other Anglo-Saxon people would endure this most despotic jurisdiction for a moment.

Positive law is overridden; and the decisions of the Federal courts are disregarded, with an insolent assumption and a "what are you going to do about it?" air, as irritating as injurious. It is full time these departmental violations of law should cease, and the officials of the Department be taught their places. The question involved in your editorial is a good one to

begin on. It is a question affecting the entire West. The whole western mining region can be united on that and other questions of pressing importance to us. If our present representatives in Congress will not carry out our wishes, we can elect men who will. And we can cause it to be understood that no party can command our support, which will not obey our will in these matters; on the eve of a Presidential campaign is a good time to begin. I am a Republican of somewhat radical record, but I, for one, am willing to subordinate partisan preferences to real interests, and to unite in aiding to the party managers that further support is dependent upon prompt and full compliance with the reasonable demands of the mining regions in this and other respects.

* * *

How to Build a Dam.

The chief cause of failure in dams of all kinds is the faulty construction of the foundation, says the *Denver Field and Farm*. Just as a house will fall by reason of a weak foundation, which may be crushed under the weight of the walls, so a dam gives way by the gradual loosening of the foundation, caused by the flow of water through leaks. Earth dams above three feet high are sure to be washed away at some time, if they do not sink gradually by the certain percolation of water through the bottom. The weight of a bulk of water three times as large as a rock will move the rock bodily, as if it were wood, and the difference of specific gravity is overcome by the height of the water over the heavier obstacle. A very small torrent will roll large boulders along its course with ease, and this enormous force of water must always be provided for in all hydraulic work. Dams should be made of timber or stone. For a safe and simple form of timber dam, the foundation should be rock or hardpan of gravel, and the mudells on the lower tier should be heeded in broken rock, pounded down firmly with a 15-pound sledge. The sills are saddled, and the cross-ties laid upon them are notched to rest upon the saddles, and two-inch pins should be put through both of the logs. Where the foundation is shelving rock, 1½-inch iron pins should be put down into the rock at least a foot, to prevent sliding. But the sliding force is almost neutralized in this form of dam by the weight of water, which lies upon the sheeting. The tiers of timber are built up and saddled, and notched. A plank sheeting is put down to the solid foundation above the first sill, and is spiked with eight-penny spikes firmly. The sheeting is filled to the foundation as close as possible, and hydraulic cement concrete is heeded in front of it, to make a tight joint. No leaks will ever trouble a dam founded in this way. The rafters should be strong enough to bear any weight of water which the stream may carry doubled. If the highest flood known is five or ten feet above the usual level, it is easy to estimate the strength of the rafter required, and then double the number of them, putting them no more than two feet apart, if the sheeting is of one-inch board doubled. If any error is made, it is the cheapest to err upon the safe side, as the cost of more material will be much less than that of a new dam, and perhaps a mill that may go with it. An apron should be put in front of the dam, to receive the overflow; this throws the weight of the water on the face of the dam, and balances so much of the pressure on the upper sides. An earth dam may be made safe by sheet piling driven to rock or hardpan or clay, in the center of the excavation. A dam should never be built on surface soil, but the center should be placed on solid ground. As the earth is put in, it should be well packed by driving oxen or horses back and forth, or by ramming it well. This prevents settlement when the water is let in above it. The ends of an earth dam should be protected with sheet piling at least two feet higher than the overflow at the center, and the overflow should pass over solid plank flooring, spiked to timbers well heeded down on the top and both sides of the dam. This will prevent washing of the top. A masonry dam should be built on a foundation of concrete, laid on solid rock, over piles driven close together, and both sides protected by sheet piling. The piles should be left to protrude into the concrete foundation. Except for water works, there should be no outlet in the bottom of the dam; but the work should be of the most solid character. A waste channel for overflow should be made on the top large enough to carry off any possible flood, and the ends of the dam should be carried up with solid masonry as high as may ever be needed to prevent outflow of the ends by the flood. A large dam should be constructed regardless of expense to secure safety in every direction, and the small details of construction are very often the most important parts of the work. Any person who might, under any circumstances, build a masonry dam in hollow shell form, and fill it with dirt, or leave earth banks on either side of the dam, should be confined in an asylum for imbecility. No doubt, considering the vast importance of securing unquestionable safety to the unsuspecting public whose lives may be endangered, all persons practicing as hydraulic engineers should be licensed only after exhaustive examination by competent men. If a veterinary surgeon or a physician—who could scarcely kill a hundred persons by the mistakes of a lifetime—must be properly licensed before he can practice, how much more should an engineer be, upon whose



TERRACING—AN INTERESTING PHASE IN THE DEVELOPMENT OF THE FOOTHILL REGION OF CALIFORNIA.

mistakes thousands of lives may impend? Every sensible man is convinced that a dam, like any other engineering work, must be built in accordance with the principles of construction. It is easy to figure exactly the force which a dam may ever be called upon to resist, and manage the construction in such a way as to provide an excess of strength and permanence, and we give it herewith.

Terracing in the Foothills.

There is a strip of country on the east and north of the San Joaquin and Sacramento valleys, that extends their entire length, known as the "thermal belt." It lies in the first foothill lands that rise out of the valleys and is only a few miles in width. There is less frost here than in the valleys; and above, the cold steadily increases until the summit of the Sierras is reached. In this region a great variety of fruit can be grown of superior quality.

Many of the hillsides, however, are too steep to be planted to orchards in the ordinary manner, but during the last few years some of them have been terraced and planted to oranges and early peaches with results that are highly satisfactory. Both the fruit require abundant water, but the land on which the trees are grown must have perfect drainage. They will then produce fruit large in size, and in great quantity, and it will ripen earlier than where less water can be used, as I have noticed for some years the finest fruit and the first to ripen was always from trees that stood near water ditches on hillsides. The ground thrown over in terracing gives depth of loosened soil that makes a rapid and healthy growth of tree and fruit, that it is thought fully compensates for the cost of the work. The terracing gives picturesque beauty to the country, of the high-

est order known to practical horticulture, thereby creating a value beyond intrinsic comparison. Newcastle, with an altitude of 1356 feet, is in a direct line 6 miles northeast from Rocklin—altitude 249 feet. Loomis and Penryn being between the two places, and all on the line of the Central Pacific Railroad, the land rising at the rate of over 100 feet to the mile. Sacramento can be seen from each of these towns and is distant from Rocklin 22 miles.

A ridge of land beginning at Newcastle runs west some two or three miles when it curves toward the south for several miles, abruptly terminating west of Rocklin, and very near the town. A large portion of the land lying north and west of Rocklin, Loomis and Penryn, between the top of the ridge and the railroad, belongs to the individual members of the Placer County Citrus Colony. The sides of this ridge are being terraced by their owners and planted to oranges, from plans made by me, and the work in part has been done under my supervision. In the spring of 1888 the work was begun on a spur of land projecting from the ridge, containing 10 acres. This lies west from Penryn two and a half miles, northwest from Loomis equally distant, and in plain view from either place. Near the base of this hill, and at the point of central approach, is a cottage house, neatly built of split granite, that is now being used as a club house, for the Colony Club. Beginning just below this house I built a zigzag avenue up the centre of the spur to the top, on a regular grade of twenty inches to the rod. This makes an easy carriage road, the steepness of the hill being overcome by the continuous curving. After the terraces were made I paved the gutters on the upper sides of the avenue, changing to the opposite side at each curve. Pipes were laid across the road as the gutter changed sides, four inch pipe being used on the upper turn, increasing to eight inch pipe at the lower crossing, as in a rainfall the water is greater in quantity at the base than at the top of the terraces. From the highest part of this spur that was to be planted I began the terraces on each side of the avenue, the first being only a few rods in length, increasing with each ter-

race until the base was reached. The terraces terminate at the side of the avenue and have a grade of two and a half inches to the rod for the running of water in irrigating. The terrace step was made level with a bank slope of 45 degrees, varying according to the steepness of the hillside. The width of the terraces as measured on the slope, was about 25 feet on an average, but only from 12 to 20 feet was the width of the level part. Sidehill plows were used in making the terraces, and they were run back and forth until the work was nearly done, when it was finished with shovels, some dirt having to be taken from high points to low places in wheelbarrows. Recent experience, however, has made me familiar with an implement called a "V" which, following the plow does the leveling much more cheaply. This implement should be made especially for this work, which I cannot describe in this article. The trees were planted 18 feet apart in the row, and near the edge of the terrace, that they might stand centrally over the greatest depth of loosened soil.

Orange trees in this section should be planted in March, that they may become well rooted before summer, when the heat is liable to check their growth if planted late. Since planting this orchard I have been nearly all the time in Southern California, and have frequently visited the orchards of Riverside, Pomona and Redlands, and I find the trees on these terraces are as large, as vigorous, as healthy, and as uniform in size, as any in the favored sections of the south, that are of the same age and were of the same size when planted.

Among the visitors to this orchard when first planted were some English gentlemen. They were so impressed with the picturesque beauty of the place, and the surrounding country, that they purchased land adjoining, and in the spring of 1890 began to terrace and plant the hillside south of the terrace planted in 1888. Continuing last spring, they now have nearly one mile in length of the hill slope terraced and planted, and many more acres are to be planted in the neighborhood during the coming season. These terraces are irrigated by several lines of pipes laid from the top running

down the face of the hill to the bottom. The distance between these lines of pipe is 330 feet. The pipes are laid under the ground, with faucets attached and coming to the surface, just at the base of each bank. Each terrace can thus be supplied with water by the opening of a faucet, and the trees can be irrigated for a distance of 330 feet, when another line of pipe is reached, this continuing along the entire length of the orchard. Near the center of this planted tract is an avenue that runs diagonally over the face of the ridge to Clover Valley. I have made a paved gutter on the upper side of this avenue, into which runs all surplus water when irrigating, and all that may accumulate on the terraces from heavy rains. A deep furrow is plowed at the base of each terrace to conduct this water to the gutter.

Many Englishmen have already located here, some of whom are gentlemen of abundant means, who have brought their families, have built substantial houses, and have come to stay. Others have purchased land which they are having improved, and will come themselves as soon as they can arrange to leave their present callings. With their national thrift, they prefer to have their country homes where a good income can be derived from their investment, rather than have their country residences in some suburban town of San Francisco, where no income is ever expected, as in the Oakland or Santa Cruz highlands that overlook the towns, as the foothills here overlook the valley and the Capital City of Sacramento.

These terraces as they lie on the face of the curving ridge that encircles the sloping valley, are like "pictures hanging on the wall" to travelers on the O. P. R. R. as they pass through the towns of Penryn, Loomis and Rocklin, and to the people who live in the vicinity they are a constant source of pleasure. When the face of this ridge from the Newcastle line to Rocklin becomes converted into terraced orange orchards, as the owners purpose doing in a few years; and when the trees attain good size, and come into bearing, they will present scenes of unique beauty unequalled by anything similar in the country.—P. W. Butler in Rural Press.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Calaveras.

NEW ENTERPRISE.—*Mt. Echo*, Jan. 9: The Utica Mining Co. has in course of construction an immense structure, 85,000 feet. It is situated on Angels creek, near the Tulloch mine and about a half mile below tows. This building is being erected, as we understand, for the purpose of catching the sulphurets unavoidably escaping from the mill. A large flume is being built from the Utica mill to the structure before-mentioned, a portion of which will be copper-plated with a view to saving the fine amalgam and quicksilver spray that cannot be saved by the first process. This is a gigantic undertaking and will necessitate large expenditures. Nevertheless, there is little doubt that the enterprise will prove a paying one.

El Dorado.

STRUCK A CHANNEL.—*Cor. Call*, Jan. 18: Monday evening of last week, Holmes & Gichel struck a channel in their mining claim about half a mile north of Georgetown, from which they took out \$8 to the pan. The next day they took out, besides smaller pieces, one "nugget" which weighed over 55 ounces of pure gold. Their "good luck" continues, rewarding them with a daily yield of \$600 to \$1200, and the end is not yet. This claim adjoins what is known as the "Van mine," owned by a Mrs. Baldwin and Mr. Garrett of San Francisco, who are just starting up their mill, with prospects of good success.

Mono.

BODIE MANAGEMENT.—*Bodie Miner*, Jan. 1: In a recent issue of the MINING AND SCIENTIFIC PRESS, a statement appeared to the effect that they were in receipt of a letter saying that the "management of the Hale & Norcross would pale beside that of the Bulwer, Bodie and Mono." To people living here in Bodie who are in a position to be informed in regard to the management of these mines, a reply of any kind would seem entirely unnecessary, but as the stock in these mines is held by persons scattered over different parts of the United States, we will say that if the paper referred to has such a letter in its possession, the writer is either a fool or a knave. We know from personal knowledge that the management under Supt. John W. Kelly has been characterized by ability, honesty and economy. That the mines are not dividend-paying is not his fault. All that an intelligent and skillful management could do to make them more productive has been done, and from all indications we believe that Mr. Kelly's efforts will be crowned with success, as the Bulwer has commenced shipping ore and a 15-inch ledge of good milling ore has been discovered in the Bodie.

HOMER MINING DISTRICT.—*Bodie Miner*, Jan. 1: The past year has witnessed more substantial and systematic work in this district than done at any other time since its discovery. We claim this for Homer district: It has a greater number of claims showing good prospects than any other district in the world; and it has a mine which is producing more bullion each week for the amount of ore crushed than any other mine in the country. We refer to the Lakeview. Ever since they started up the two-stamp mill last spring, the lowest production of bullion per week has been \$1300, and the highest \$5000. If there is another mine that can make as good a showing, we should like to hear of it. The Lakeview is owned by Eastern capitalists, who, for several years, have been paying out considerable money for assessment work, etc. Last June, one of the company, Col. C. A. Dyer, came out from Maine to see what they had in the way of a mine. After a thorough examination of the property, he was more than satisfied, and was well pleased with the work done by Supt. Pierce. Col. Dyer remained here, and proceeded in a manner which showed that he was the right man in the right place. Many things had to be done and many obstacles overcome, and that in a short time, to thoroughly equip the mine. Roads had to be made, a mill bought and put up, and 2000 feet of tramway built. All of this has been accomplished already, with the exception of putting together all of the mill machinery, and that is being done as fast as circumstances will permit. Within a short time, the company will have the ten-stamp mill in operation. Careful estimates of the value of the ore in sight have been made by competent persons, and they place it at upward of \$2,000,000. A winze is now being sunk on the west vein, and the ledge increases in width and improves in quality as depth is attained.

THE BODIE MINES.—*Bodie Miner*, Jan. 9: The Standard continues to make regular shipments of bullion. Within three months two dividends of ten cents each have been declared, and there is every reason to believe that there will be several more this year. The Syndicate, Bechtel and Bodie tunnel is leased by Sam Tyack and J. F. Parr, who employ quite a number of men altogether. During the year they have taken out a large quantity of ore that has paid them well. The Bulwer is now supplying the Bodie mill with ore and will probably continue doing so for an indefinite period. It is well known that there is in the mine a large quantity of low-grade ore, and it is now reported on the streets that some very rich stringers have been discovered, and the low grade in connection with these can be worked very profitably. The Bodie and Mono are being prospected in a thorough and systematic manner, and from the late reports of the superintendent it looks as if his efforts would soon be rewarded. The Summit, we consider one of the most promising in the district and feel confident that a year from now it will be employing more men than any other mine in Bodie. The shaft is being cleaned out and retimbered as rapidly as possible.

Napa.

SHIPMENT OF QUICKSILVER.—*Calistogian*, Jan. 6: During December last, the number of flasks of quicksilver produced at the mines, brought to Calistoga and shipped by rail, were as follows: Napa Consolidated, 375; Great Western, 271; Bradford, 250; Sulphur Bank, 150. Total flasks for Dec. 1, 045. In December, 1888 the shipments from these mines were 1,005 flasks; in Jan. 1889, 972 flasks; in Aug., 1891, 957 flasks. Shipments for these three months were the largest each for over four years—

as far as we took pains to ascertain—until the shipments for last month. In Dec. '88, Jan. '89 and 1891, the increase was due to large shipments from the Napa Consolidated mine.

Nevada.

CALIFORNIA MINE.—*Grass Valley Union*, Jan. 2: The shaft of the California mine is now down 65 feet below the 200-foot level, and the work is being pushed as fast as possible in order to open a new level. The drift south on the 200 level is being extended, and the vein although only a foot in width is of excellent quality and gives good returns in the mill. The mine has never looked as well as now. With the opening of a new level there will be 150 feet of backs, which will furnish ore for the mill for a long time to come.

ORMONDE DISTRICT.—The Maryland claim on the South Yuba, near Canyon creek, is being developed in good shape by Messrs. Donahue and Stewart. They are extracting ore right along from Tunnel No. 1, which is in 80 feet with a 70-foot upraise. There is about 100 tons on the dump, and it will be crushed soon at the Washington Co.'s mill. They recently started another tunnel that will give them 200 feet of backs.

FRENCH CORRAL DISTRICT.—The Kate Hayes Co., although much hampered by the restrictions of the anti-mining injunctions, are working away regularly to enough advantage, to keep the town from absolutely going to decay. They wash the bank by the hydraulic process, then raise the debris 40 feet with an elevator, and run it off into settling reservoirs, so that nothing but clear water passes into the Yuba.

BIRCHVILLE DISTRICT.—A few years ago the white miners being scared off by the antidebris litigation, a company of Chinamen bought a gravel claim situated between the towns of Birchville and Sweetland. They paid \$4000 for it. They are still working there, and up to date have taken out a little over \$50,000.

SWEETLAND DISTRICT.—R. Thomas is preparing to work out a hitherto neglected point in his placer claim, and it is safe to foretell that he will find enough gold to pay him handsomely. The ground was worked for a number of years until a comparatively late period, and it has yielded several big fortunes.

PLEASANT VALLEY DISTRICT.—The Beckman Hill Company of this city, who are prospecting for the blue lead that is supposed to pass through their claim in traversing the country between French Corral and Mooney Flat, have their incline into the hill about 150 feet, and expect to reach the channel within 400 feet from the starting point. The incline has a descent of only about one foot in five. Much wash gold has been heretofore found in that vicinity, and the Beckman Hill Co. has a good show for striking the main deposit.

LOWELL HILL DISTRICT.—The Ballantyne claim, owned by Oscar Foss of San Francisco, is being prospected by Jerry Holland and M. Skeahan. Work on the China claim at Remington hill is being pushed rapidly ahead. The tunnel is now in about 800 feet. A. Papa is busy prospecting for gravel at his claim at Melbourne. M. F. Skeahan is taking out gravel at his claim on Democrat hill. Richard Neville is also interested in the claim. They are talking of running a bedrock tunnel in the spring.

GRANITEVILLE DISTRICT.—At D. R. McKallian's National mine, on the ridge this side of Graniteville, the shaft is being sunk and is now down over 50 feet on the ledge. The new hoisting and pumping rig operates admirably. During the past summer Mr. Killican has been getting out some good ore from the upper workings, and the crushing has been done in a five-foot Huntington mill that is on the claim. About a dozen men are employed at the California. For some time past Mr. Foley has centered his efforts on opening up new ground, and now he has a quantity of high-grade ore in sight. The mill, which has been undergoing needed repairs, will soon begin to drop its stamps again.

COTTONTAIL MINE.—*Grass Valley Telegraph*, Jan. 9: We saw some very good ore this morning from the Cottontail mine, near Rough and Ready. Jas. Stead and others of Grass Valley are working the mine, which is located on the Torpie place near Rough and Ready. The shaft is now down about 30 feet and has a good-sized ledge in the bottom, which is well-filled with mineral and shows free gold. The prospect is a good one and will be fully developed.

MINES AND PROSPECTS.—*Transcript*, Jan. 7: The mining industry throughout Nevada county is full of promise for the future. Never at any former period has so much capital been invested in the business, and never has so large a percentage of the claims been yielding bullion. There is no excitement, no inflation of values on account of this gratifying condition of affairs. Everything is being done on a legitimate, and therefore wholesome basis, the same as shrewd and experienced men in mercantile or manufacturing pursuits would go to work to expend their labor and capital in a way likely to yield a reasonable income. The gay and seductive "wild cat" of the feverish and demoralizing days of old, does not find this congenial climate to purr in, and has probably left us never to return. The reports of progress, which are published in the *Transcript* from time to time are well worth reading. They are plain, unvarnished accounts, devoid of exaggeration and glamour so common to mining articles, and which invariably do more harm than good.

YOU BET DISTRICT.—J. S. Goodwin has ten men employed driving a tunnel from the bottom of his incline shaft, which is down 200 feet. The tunnel has now advanced 400 feet, and within from to 50 feet more will reach the blue lead that extends across the country from Dutch Flat to Blue Tent and North Bloomfield. Judge Giles S. Brown and J. Feeley are working the old Brown brothers' claim adjoining Goodwin's on the south. They have a number of men employed taking out large quantities of gravel, and are making money fast. In the sixties, between 6000 and 7000 dollars worth of gold was taken from a small piece of ground in that vicinity. It is one of the richest sections in the county. James McManus has been prospecting for quartz during the past four or five years, at a point on Bear river about two miles from the town of You Bet. He pegs away all alone, sinking shafts and driving tunnels, and expects to eventually find a bonanza. He has obtained good prospects in several spots. County Supervisor Buffington of this city and Warren H. Pierce have been prospecting

for some time at You Bet station on the line of the N. C. N. G. R. R., and as that vicinity is literally seamed with a series of ledges that give every indication on the surface of carrying gold, it is fair to presume that these gentlemen, both of whom are experienced miners, will in time have a big and valuable mine there.

GRASS VALLEY DISTRICT.—The shaft of the Centennial quartz mine has been thoroughly repaired, and things are in good shape for the resumption of operations, which will commence in the spring. The Pennsylvania five-stamp mill has been started up on a large quantity of first-class ore, says the *Tidings*. The prospects underground are very encouraging, the ledge being of good size and the ore of undoubtedly profitable grade. The *Union* says that the shaft of the California mine is now down 65 feet below the 200 level, and the work is being pushed as fast as possible in order to open a new level. The drift south on the 200 level is being extended, and the vein, although only a foot in width, is of excellent quality and gives good returns in the mill. The mine has never looked as well as now. With the opening of a new level there will be 150 feet of backs, which will furnish ore for the mill for a long time to come.

HUNT'S HILL DISTRICT.—The Chinamen who bought the old Harney & Goodspeed ground at Hunt's Hill have a big force of Mongolian drifters at work and are taking out lots of money.

COLUMBIA HILL DISTRICT.—The stockholders of the St. Gothard feel jubilant over the discovery in their mine of an 18-inch ledge, as recently announced in these columns. They have spent many thousands of dollars there in putting up fine hoisting and pumping machinery and sinking one of the best shafts in the county, and they deserve all the good fortune that can come to them. The Delhi continues to turn out big gold bars with its customary regularity. It is a big mine, has a complete equipment and is ably managed.

MOORE'S FLAT DISTRICT.—Since the hydraulic mining industry was suppressed, Moore's Flat has been as quiet as a graveyard. Nothing is being done there in the way of mining, except by a Chinese company that is putting in a dam to restrain debris and will shortly begin cleaning up some bedrock that is known to be rich. At Allegheny, just across the Middle Yuba from Moore's Flat, the Rainbow mine, which has been fabulously rich in spots during former years, but in which the pay chute has been lost for some time, is again coming to the front. A fine body of ore has been found recently, and the owners are in a fair way to soon reap abundant reward for the thousands of dollars they have spent and the pertinacity and faith they have manifested in keeping the prospecting work going ahead.

NEVADA CITY.—*Transcript*, Jan. 8: Dr. Carl Muller this week located a quartz claim on Gold Flat, just in front of Dan O'Donnell's farm and adjoining the Sneath & Clay on the south. An incline will be sunk in the spring.

RELIEF HILL DISTRICT.—The Union drift claim at the town of Relief Hill has a number of owners, including R. P. Rossen, C. O. Jepson, Wm. Harris, John Jepson and Fred Beck, who are the working partners. They have been operating three or four years, and their tunnel is in 1700 feet. They are on an overflow from the Bloomfield channel, they think. Its average width is 150 feet, and the gravel is breasted out for from five to ten feet above bedrock. The gold is of medium fineness, although occasionally nuggets weighing as much as two ounces are found. The claim has free water part of the year. For the last two years it has been paying its way and gives good promise of eventually making its owners rich. The December cleanup was about \$5000. The Davey Bros. and W. H. Penrose, who have leased from the Eureka Lake Co. the Echo claim on the east side of Relief Hill, are in with their tunnel between 500 and 600 feet. They expect to reach pay dirt soon. A Chinese company is drifting the old Waukesha claim with good results. Several parties are doing their annual assessment work in this district, and some of them are liable to stumble on a bonanza most any day.

CENTRAL HOUSE DISTRICT.—The Centennial Co., who have been hunting in the Washington ridge so many years to find the blue lead channel that is known to come down that way, are liable most any day to strike into the heart of it. For some time they have been finding more or less gravel carrying gold, but the bedrock was inclined too much to satisfy their requirements, and they have been driving ahead for the center of the channel. The Central Co. recently found gravel in their tunnel, but the bedrock is pitching off and they are in too high. They will work the ground through a shaft sunk some years ago, and will utilize the tunnel for drainage. The San Jose Co. have not yet got out of the quarrel among themselves that has so long interfered with their going ahead and developing their claim. It is believed that they have some good gravel and that a little more preliminary labor will put it on a paying basis.

NUGGET HUNTING.—*Grass Valley Telegraph*, Jan. 9: During rains or just after, and when the rocks are washed clean, many here are in the habit of going out and looking over old dump piles at quartz claims and along the gulches where placer mining was carried on in the early days, for the purpose of finding gold specimens. In the last few days, a number of nice lumps were picked up—enough to pay pretty well for the labor of searching. Wm. Roland found, on Deadman's Flat, a lump of quartz, and the size of it was about that of the fist of the average man. Lumps of gold, like unto birdshot in size and shape, were all through the lump. A number of experts estimated the value of the specimen, and none put the amount less than \$100.

ST. JOHN.—Friday afternoon, a splendid new ledge seven feet in width was encountered in the St. John mine (Knights of Malta). The ore is different from that which has ever been taken out of the mine heretofore, and it is pronounced by those capable of judging to be ore of superior quality. While but a little free gold can be seen in the ore, it is literally filled with lead and sulphurets. Supt. T. H. Moore informs us that the mine is improving as depth is obtained. The ore taken out Friday evening was from the depth of 230 feet.

LONE TREE.—For several days past, John G. Johnson has had men working on the Lone Tree mine, in the neighborhood of Forest Springs. A new shaft is down about eight feet, and a four-foot ledge showing plenty of free-gold was found. The

rock looked and prospected so well that Mr. Johnson will keep the work going ahead. The Lone Tree has always been regarded as a valuable mining property.

San Diego.

BANNER AND JULIAN. Jan. 7:—The Ruby Co. are working the Wilcox mine at Banner. The ten stamps at the Helvetia mine make merry music on the ore that is coming up the shaft. A good many of the claims on which the assessment work was done last year have been relocated. The Cincinnati Belle has been put to considerable delay on account of the broken whim. The 200-foot shaft contracted by Murphy Bros. has been completed.

Shasta.

MACARTHUR-FORREST PROCESS.—*Redding Free Press*, Jan. 4: The Calumet Co. having made a series of experiments on the process, as applied to their ores, are making heavy expenditures, and will without any more delay than possible, so we are informed by Mr. A. B. Paul, manager of the company, bring the working up to 50 tons a day, they having stamping capacity already in for that number of tons. The Shasta Gold Extraction Co.'s mill is fully fitted up for the process, but has been prevented running on account of the bad roads making it impossible to get ore to the mill at a reasonable expense. With these two mills in operation, it will be an easy matter for our millmen to get a practical idea of the working of the process.

Sierra.

GOOD PAY.—*Mt. Messenger*, Jan. 2: The workmen in the Telegraph mine found good pay a short time since. The gravel prospects from \$10 to \$12 a carload. How much gravel they have or what the channel is they do not yet know. Seven ounces of gold were brought down last Wednesday by Gardner & Mitchell.

YOUNG AMERICA.—*Mt. Messenger*, Jan. 9: John Barnard came down from the Young America mine last Monday. He reports 60 men employed, all told. It is generally thought that the explosion of Giant powder in one of the batteries was purely an accident, and no one is to blame. The cleanup of the Phoenix quartz mine, Sierra City, for the past 25 days, was \$4800.

Siskiyou.

PLENTY OF WATER.—*Siskiyou Telegram*, Jan. 9: The gravel miners throughout the county are confident of a prosperous season this year, as they will have an abundance of water to successfully carry on operations.

QUARTZ.—*Yreka Journal*, Jan. 4: Quartz mining is carried on energetically at present at Humboldt, all the mills being kept in operation steadily. By means of sleds, the quartz is hauled to the mill with greater ease than by wagons, hence a great amount of gold will be realized during the present winter.

RIVER MINING.—The river miners along the Klamath are still taking out pay gravel, with good success, and if we have no heavy rain storms, they will be able to continue operations all winter before high water interferes.

THE HYDRAULIC MINERS have commenced work in several localities, and others will be able to do so shortly, provided the nights are not too cold to prevent the snow from melting to fill their ditches. The hydraulic miners will have the best season ever known in Siskiyou, from the fact that there has not been any rain of consequence to dissolve the vast quantity of snow on the hills and mountains.

MANY PLACER MINERS have been enabled already to commence ground sluicing and washing in extensive lines of sluices with good success, and are likely to continue doing so until late in the summer, or until winter is at hand again, which will be an unusual occurrence. The coming summer will have to be an extraordinary dry and long-continued hot season to prevent the miners from taking out more gold than during any previous year since the settlement of our county by white people.

NEVADA.

Tuscarora District.

DEL MONTE.—*Tuscarora Times-Review*, Jan. 9: Second level: West drift from No. 1 joint raise in 53 feet, with seams of low-grade ore in the face. The stopes opened up on the line have exposed good ore two feet wide. Extracted four cars first-class ore, assay \$260 per ton, and 38 cars of second class, assay \$33 per ton.

NEVADA QUEEN.—Second level: No. 1 south drift advanced 13 feet, face in vein porphyry. No. 2 south drift extended 22 feet, showing a seam of ore in the face.

NORTH COMMONWEALTH.—Second level: Winze from second level sunk 30 feet in porphyry. West drift from winze chute in 15 feet; seam of good ore four inches wide. East drift from same point advanced 22 feet, 2½ feet of ore, average assay \$166 per ton. Hoisted seven cars first class and 43 cars second-class ore. The ore shipped (42 tons) has been delayed on the road by heavy snow storms, but will arrive at the railroad to-morrow.

COMMONWEALTH.—Fourth level: Joint raise has been put up 20 feet, cutting seams that indicate the proximity to the footwall of the vein.

NAVAJO.—A drift started on a vein running south from the 350-foot crosscut, has advanced 11 feet, giving some very fair assays. No. 2 winze below 350-foot level sunk five feet and was stopped. The stopes are producing as usual.

BELLE ISLE.—Intermediate drift below 350-foot level on No. 2 vein, extended four feet, showing very fine ore. The stopes on Nos. 2 and 3 veins are without any change and are yielding as usual.

NORTH BELLE ISLE.—No. 3 north drift, 400-foot level, advanced 16 feet, showing some good ore in the face. No. 1 intermediate winze from intermediate, sunk seven feet, showing a strong vein of high-grade ore. No. 4 north drift, 500-foot level, advanced 19 feet, showing some very fine ore. The stopes are yielding as usual.

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Chronicle*, Jan. 9: 1100 level.—The west crosscut No. 1, from the south drift, has been extended 71 feet; total length, 574 feet; the face being in west country rock. From this crosscut, at a point 520 feet in from the main north drift, a north drift has been advanced 25 feet in a quartz formation carrying a nominal value. From the drift run southeast from the main south drift, 40 feet south from the east crosscut No. 4, at a point 130 feet in, a west crosscut No. 2 has

been advanced 25 feet, in porphyry with quartz of low assay value. 1750 level.—In working out and upward from the bottom of winze No. 2, sunk from the 1650 level we continue to extract ore of fair quality. Have also extracted some milling ore at the point where the upraise carried up from the crosscut run west from the southwest drift made connection with the stapes on the eighth floor. Have continued to extract ore of average quality at the point where the upraise from the southwest drift 70 feet north from the south line of the California ground connected with the eight-floor stapes. In the east crosscut No. 3, from the main south drift, some ore has been extracted. There has been extracted from all parts of the mine during the week 994 930-2000 tons of ore, which was shipped to the Morgan mill. The average value of all of the ore worked at that mill during the week, 980 tons, was \$22.95 per ton. Bullion shipped to Carson Mint, assay value, \$18,541.83.

OPHIR.—1465 level.—At a point in the main south drift on the sill floor of this level, opposite the upraise No. 2, a drift was started and has been advanced in a southeast course 30 feet. From the end of this southeast drift an upraise has been started and will be carried up to connect with the drift run west from the winze 122 feet below the sill floor of the 1300 level. No ore has been extracted or hoisted during the week.

MEXICAN.—On the 1465 level the crosscut started west from the bottom of the winze sunk 101 feet down from the end of the crosscut run west from the main north lateral drift near the south boundary line of the mine, has been advanced 90 feet. Have enlarged the station at the head of the winze and are now placing therein a small engine hoist.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. west drift from the shaft has been extended during the week 30 feet; total distance west of shaft, 1625 feet. The face is in hard porphyry.

SILVER HILL.—During the week have repaired 100 feet of the south drift from the Justice shaft, 490 level. This drift reaches nearly to the north line of the Silver Hill.

ALPHA.—The north crosscut from the winze, 550 level, is out 217 feet; face in clay and quartz yielding low assays. The west crosscut, 79 feet south of winze, 550 level, is out 14 feet; face in low grade quartz.

CHOLLAR.—The north drift from incline station, 1500 level, is out 60 feet; face in porphyry. The joint west crosscut on north line from Hale and Norcross, 1640 level, is out 57 feet; face in porphyry.

POTOSI.—The south drift from top of raise, 1200 level, is out 60 feet; face in quartz yielding low assays. The east crosscut from the winze station, 1400 level, is out 74 feet; face in porphyry. During the week, have started an east crosscut from the winze station, 1500 level; it is out four feet; face in porphyry.

BULLION.—The east crosscut on the north line of the 1300 level is out 508 feet; face in porphyry. East crosscut on north line, 1400 level, is out 67 feet; face in porphyry.

WARD COMBINATION SHAFT.—West drift from the shaft, 900 level, has been advanced a total distance west of shaft 1625 feet; face in hard porphyry. The southwest drift, 1800 level, is out from the shaft 940 feet; face in porphyry.

CON. NEW YORK.—The west crosscut No. 3, 650 level, is out 41 feet; face shows three feet of quartz. The west crosscut No. 4, 70 feet north of shaft, same level, is out 70 feet; last eight feet of quartz shows bunches of fair grade quartz.

UTAH.—750 level: At a point 50 feet south from the winze station, west crosscut No. 1 has been advanced a total length of 189 feet; in porphyry and west country formation. A north drift has been started and advanced eight feet from a point 140 feet west of the shaft station.

ANDES.—On 420 level, north drift from east crosscut No. 4 advanced 22 feet; face in quartz and porphyry that yield low assays. A north drift has been started from east crosscut No. 6 at a point 50 feet east of the main north drift.

UNION SHAFT.—West drift, 900 level, is out west of shaft a distance of 1625 feet; face in hard porphyry.

BEST AND BELCHER.—900 level: North drift from top of upraise from 1000 level has been advanced 30 feet, through hard porphyry; total length 50 feet.

GOULD AND CURRY.—400 level: Upraise No. 2, 300 feet southwest of shaft has been carried up 18 feet; total 32 feet; face in soft porphyry and quartz showing some value.

OCCIDENTAL.—The drift started north from west crosscut in south drift on 350 level has been extended nine feet in fair grade ore.

ARIZONA.

MINNESOTA DISTRICT.—Mohave Miner, Jan. 9: The Eagle mine in Minnesota district has closed down.

WEAVER.—W. A. Neal and John McGregor have returned from their prospecting trip in Weaver district. They brought in some good-looking rock, which assayed so well that they will go right away and develop their new find. Tom Steen has a pretty good thing in Weaver district, in his Jenny mine. He has 40 feet of ore stripped ready to take down. The ore streak is from 18 to 20 inches in width, and runs away in the hundreds in silver.

CEDAR.—It is expected that work will be commenced on several good mines in Cedar district as soon as the snow disappears from the mountains. There are a number of excellent properties there that can be made pay handsomely on an investment of from \$50,000 to \$750,000.

CERBAT.—Work will shortly be commenced on the Cerbat mine, owned by the Arizona Northern Mining Co. of Minneapolis, Minn., of which John Barry is superintendent. The mine is one of the best in that part of the Cerbat range of mountains, and will prove a great bonanza under proper management. The Gold Bug mine still continues to improve as depth is attained. Fortysacks of \$600-ore was taken out recently in a day and a half by the lucky owners, and they have by long odds the best paying property in the new district. They have two tons of high-grade ore at the sampler awaiting treatment. Wm. Heimrod has taken a lease on the Mineral Park mill, which will immediately be fitted up as a wet crusher, with plates and concentrators. RICHMOND BASIN.—Silver Belt, Jan. 9: Rich-

mond Basin mines are again coming to the front as silver producers. J. W. Killen is reported to have made a fine strike in the Nugget mine, owned by E. F. Kellner. Joe Henry and Geo. Kingdon, lessees on the Mack Morris, have good ore, and Geo. Wilson and Leroy Ikenberry have taken out ore in quantity, which they will soon mill. Joe Brewster brought in several tons of ore recently for shipment, and has an excellent showing in his mine.

OLD DOMINION.—The Old Dominion Copper Co. has been delayed in blowing in its new furnaces, owing to the failure of water in its new well. A short time ago the supply was abundant, but last week the discovery was made that there was not near enough water to supply its plant. The work of sinking has been carried on day and night this week, and the water is steadily increasing. Two furnaces will be in blast within a few days.

ARIZONA.

THE OLD DOMINION COPPER CO.—Arizona Silver Belt, Jan. 2: The business of the Old Dominion Copper Co. for the year 1891 has not been fully computed, but very accurate estimates have been made which show that the year just closed was a fairly prosperous one for the company. Of ore there was smelted 28,800 tons, and the product of copper was about 7,270,000 pounds, as against 7,720,000 in 1890. The lessened output was due to the floods in February last, and to several other unavoidable interruptions. A large amount of development work was done and many important improvements made, chief of which is the new smelting plant and cable tramway now about completed. The large amount of extra work performed necessitated the employment of an increased force, and there are now about 200 men employed by the company at mine and smelter, and nearly, if not all, of the present force of employees will be retained, as the company expect to work their properties on a large scale the present year. The two new smelters, with a daily capacity of about 70 tons, will be blown in about the 6th or 6th inst., and it will require a large and steady supply of ore and coke to keep them running. The new plant is one of the most complete of its kind in the Southwest, and is highly creditable to Supt. A. L. Walker, to whom its erection is due, and who worked out the designs himself to the minutest detail. Following is the yearly production from the commencement of operations by the old company: 1882, 1,940,770 pounds; 1883, 4,584,530 pounds; 1884, 7,368,675 pounds; 1885, 4,886,610 pounds; 1886, 4,567,665 pounds; 1887, 1,444,770 pounds; total, 24,792,960 pounds. New Company—1888, 4,633,160 pounds; 1889, 5,915,510 pounds; 1890, 7,720,015 pounds; 1891, 6,270,000 pounds; total, 25,558,685 pounds.

BRITISH COLUMBIA.

BIG SURFACE SHOWINGS.—Nelson Miner, Jan. 6: William Moore and William Lewis are hard at work on the Peterborough, a claim located to the north of the railway and about ten miles west of Nelson. The Peterborough is in a section abounding in big surface showings, but the dozen or more claims which have had work done on them still remain of doubtful value.

TUNNEL ON THE LIZZIE C.—Three men are at work driving a tunnel on the Lizzie C, a claim 2½ miles below Nelson. The tunnel is in 60 feet, and when in 200 will tap the ledge at a depth of 150 feet. The owners of the claim—Tom Collins, Dr. La Bau and others—think they will have a mine when the ground is properly opened.

SILVER KING.—The report that the Silver King mine has been sold to a Scotch company is now generally believed. It is not known what price was paid for the property, but it is supposed the Hall interests (one-half) receive \$500,000. The capital of the purchasing company is stated to be \$2,500,000.

COLORADO.

AT LEADVILLE.—Herald-Democrat, Jan. 7: The mines of North Iron Hill have been rather neglected by us for a few weeks, but it must not be thought from the absence of reports from that section that no work is going on there. Quite the reverse is the case, and the Dolomite shaft, which is probably the most northern one, is being sunk quite rapidly, having already attained a depth of more than 320 feet. The bottom is still in the quartz matter, highly mineralized, spoken of in our last report, and gives promise of soon catching the chute upon which the Flagstaff folk worked last year, and from which they shipped so much good ore. As the dip of the strata from the Flagstaff is toward the Dolomite shaft, it is reasonable to suppose that the latter will catch that ore body about 50 feet lower than it was met with in the Flagstaff. The Flagstaff lessees have made the initial effort in starting up, by doing a lot of work in No. 1 shaft, though the chances are that, ere long, No. 2 shaft will be carried down at least 100 feet farther. Caves have occurred in the Toyama and Avoca claims that have extended to the Belgian stapes, and which will necessitate the driving of a new drift from the 413-foot level in order to reach even this small streak. At the Humboldt, in the north drift run from the bottom since the shaft was sunk some 60 feet deeper, the upraise has been successfully accomplished and the ore streak caught about half way between the two levels. This, however, was found to be dipping so fast that the level was carried forward, and the ore is now disclosed on the breast, and shipments are being made from it. The ore seems to be from the original chute, from which so much good ore has been shipped, as some streaks in it carry about 15 per cent of lead to the ton, whereas latterly the ore has been of a dry, silicious nature. Altogether, the outlook in that particular region is encouraging, and without doubt this month will see a considerable improvement in many of the mines located there.

OVER 100 TONS A DAY.—Aspen Times, Jan. 9: The Holden Lixivation Works are treating over 100 tons of low-grade ore per day and shipping the product by express. The product runs from \$4000 to \$17,000 per ton. The supply of ore for the works is unlimited. Four carloads of 500-ounce Mollie Gibson ore were on the track for sampling at Taylor & Brunton's yesterday.

THE MINERAL FARM.—The fifth level of the Mineral Farm has been run north of the incline over 30 feet in good ore. A 40-ton lot from this

place was sampled yesterday, from which the grab sample ran over 46 ounces. The footwall sump will be ready to-morrow to receive the water that comes through the hanging wall on the fourth level. Work on the incline will be started in a few days.

THE BEST FRIEND.—Late developments in the Best Friend mine are exceedingly encouraging. Manager Casey has been running a drift southerly from the bottom of the incline to develop that portion of the mine. The drift was below the line of the main ore body, but a few days ago he upraised a few feet and opened into a body of very high-grade mineral, three feet of which averages about 365 ounces silver per ton.

DAKOTA.

EXPERIMENTAL PLANT.—Deadwood Pioneer, Jan. 9: The machinery for the experimental plant of McGee & Dahlgren arrived yesterday and will be immediately put into position. The blowing in of the plant has been delayed over a month by the non-arrival of this machinery, and now that it has arrived, it will soon be demonstrated to the people of this section that the process of these gentlemen will revolutionize the treatment of refractory ores.

GALENA.—Mr. S. Moll, of Galena, who arrived in this city yesterday, reports but little mining being done at present at Galena, and probably will not be until spring.

IDAHO.

RAILROADS DISCRIMINATING.—Snohomish Eye, Jan. 4: The mine owners of the Coeur d'Alene country have decided to close down all the mines in that district on Jan. 15th, unless the Northern Pacific and Union Pacific railroads grant a reduction of \$2 per ton on all ores to Missouri river points. The present rates are said to be exorbitant, and it is charged that unjust discrimination is practiced by the railroad companies against the mine owners. The charges on a carload of ore from the Coeur d'Alenes to Omaha is \$360, or \$18 per ton, while the tariff on a carload of wheat from Tekoa to Chicago is only \$240, or \$12 per ton. This discrimination is rendered more apparent from the fact that ores are shipped the whole year around, while the shipment of wheat is only for a season of the year, and is a more or less perishable product. This difference, it is claimed, is in no wise caused by the cost of handling, because the miners load the cars and the railroads do nothing but haul the ore from the mine. If the railroads should give the reduction asked, the mine owners claim that they will then be paying \$4 per ton more for the haul to Omaha than is paid for transporting wheat from Tekoa to Chicago.

VENUS.—Silver City Avalanche, Jan. 9: Vigorous work on improvements is now going on at the Venus mine, recently purchased from the Norton Bros. by E. H. Dewey, who has interested Pittsburg parties with him in the property. Men are now at work building a boarding and bunk house, blacksmith shop, etc., and a tunnel, which will be over 600 feet long when it reaches the ledge, has been begun. The mine, which lies near the summit of Florida Mountain, southeast of Jacobs' Gulch, where so much rich placer ground was worked in early days, is the farthest west of any ledge discovered on that mountain. It is a very wide ledge—in fact its width has not yet been determined, and the ores in it work very free and can be milled probably by the cheapest process.

NAKED TRUTH SOLD.—John Biggs sold his interest in the Naked Truth and Leopard mining claims to E. H. Dewey, who had formerly purchased Pete Donnelly's interest in the same properties. These two claims lie on the east side of Florida Mountain, about midway between the Trade Dollar group and town, and persons acquainted with them say that they both make a fine showing for the amount of work done on them.

IDAHO.

DE LAMAR BULLION.—Nugget, Jan. 4: Eight bars of bullion were sent out on the stage last night and four more follow to-night, making, with the 16 shipped during December, 28 bars for the month. The average value of these bars is \$2000, or \$56,000 for the month. On account of using new pans, the shoes and dies of which had not been thoroughly broken in, and numbers of slight delays caused by the machinery being much of it new, the above amount may not be considered a fair average of what the output of the mill will be. An evidence of this is the fact that the yield of the first half of the month was only eight bars. As the present mill would be worn out before the ore in sight could be worked up by it alone, it may readily be inferred that the contemplated larger mill will be added this year, and the dividends declared be correspondingly increased.

LOWER CALIFORNIA.

ALAMO.—Lower California, Jan. 2: The rich vein recently struck in the Princess mine is widening out and getting richer. It is believed to be the true Aurora vein. There is much activity among small mine owners, and the custom mills are crowded with ore. The new strike in La Flor mine holds out and promises to be a bonanza. Rich rock is coming up from the Candelaria, controlled by Geo. Zimpelman. Several Mexicans are placing at Las Encinitas, down towards Santo Tomas canon.

MONTANA.

CAMP CREEK.—Inter-Mountain, Jan. 9: The next railroad enterprise to be inaugurated in this county is a road to the new and promising mining district of Camp Creek. It is likely that the Union Pacific Co. will build the road, starting from Melrose and following an easy grade a distance of 12 miles to Camp Creek. This section is beginning to attract considerable attention in mining circles, and particularly among Eastern capitalists who have their agents in this State looking around for profitable fields for investment. It is understood that negotiations are now pending for the purchase by an Eastern company of a group of the most promising claims. Should it go through, it will give Camp Creek a boom which it has never had, unless it has been among the prospectors who have been flocking in there during the past year locating every available foot of ground. The prospects of Camp

Creek, as far as developed, show the highest grade ore of any new mining district in the State. This district is about 25 miles south of Butte.

NEW MEXICO.

THE OLD GOLDEN RULE MINE.—Southwest Sentinel, Jan. 9: There are four carloads of ore at the depot in this city, shipped by N. Bell from his Santa Rosalie mine, in the Dragoon mountains, formerly the well-known Golden Rule mine. Owing to his inability to get teams to haul the ore to the mill at Pinos Altos, Mr. Bell has directed that no more ore be shipped here from the mine until a contract can be made for hauling it. Last week, Mr. Bell directed Assayer Black to take a disinterested party and carefully and fairly sample a carload of the ore, which was just as taken out of the mine, without sorting. Mr. Black did so in the presence of Mr. C. F. Bottom of this city, and a representative of this paper was shown the assay certificate of Matthews & Black, the reliable assayers, and the value shown was 2.4 ounces in gold and 3.2 ounces in silver per ton, or about \$50 per ton. This for a condemned, "salted" mine is certainly a good showing, and Mr. Bell will reap a rich reward for his faith in the property.

OREGON.

WHITE SWAN.—Bedrock Democrat, Jan. 4: The person who has not recently visited the White Swan mine, east of the city, has a faint idea of the scene of activity presented, and the change from what it was less than three months ago, about which time this wonderful gold deposit was discovered. At that time, there were no signs of civilization manifest, but now the visitor is confronted with evidences of an embryo city. The coming spring, the White Swan Company contemplates an enlargement of operations, which will necessitate more buildings. In addition to this, other discoveries in that vicinity will be worked, adding increased improvements, putting the new camp on the high road to become an important settlement in Baker county in a very short time, the future of which may have in store many possibilities.

BAKER COUNTY MINES.—Owing to the heavy snows on the mountains and the blocking of the highways, there is little news concerning mining operations in the various camps. The mines in operation are well supplied with everything required during the winter months, and only in extreme cases is there any necessity for the owners or miners to come out to civilization. The number of mines being worked this winter is greater than ever before in the history of Baker county, and by the approach of spring, the progress made in development will also be greater than ever known before, thus offering an inducement for capital to make examinations and investments. The year 1892 will certainly mark an era of unequalled prosperity for the mines of Baker county. This seems to be the prevailing opinion among mining men; in fact, the whole community.

ON GALICE CREEK.—Grant's Pass Courier, Jan. 7: D. L. Green was in from the Sugar Pine mine on Galice creek Thursday last. This property, which has been worked with an arrastre for 16 years, has always yielded well, but a few days ago the lower tunnel, which is now in 500 feet, ran into the ledge which had been opened on the upper level, and a vast body of high-grade ore was exposed. Free gold and galena, which will yield 5000 and upward to the ton, with every indication of being a permanent ledge, would make any old miner feel as though he had at last struck it rich, and the boys certainly have done so. Their arrastre is so situated that the ore from the tunnels gravitates from the ledges and there is no time lost in putting it through the mill. The mines are situated 30 miles southwest of Grants Pass, and the gold dust and concentrates are shipped from this city. There has been an impression that the quartz ledges of Josephine county were merely broken pockets, and that no well-defined ledge of any length had ever been found. The Green Bros. have run over 3000 feet of tunnels, besides many feet of shafts, and the ledge presents an unbroken front at all points.

UTAH.

CAMP CROSSCUTS.—Park Record, Jan. 9: Ore-hauling is now very active. The roads are in splendid condition, and all the ore contractors are taking advantage of them. Johnny Varcoe is putting in a large ore chute, and making other extensive improvements in connection with his jigs at the May Flower dump. The trouble at the Anchor shaft has all been settled and sinking is going forward rapidly. An entire new force of miners and engineers has been employed. The Northland people has a force of men at work continuing the raise being made in that property to locate the apex to the vein in dispute. The Lawrence boys are still prosecuting work on their Treasure Hill claims. The tunnel they are driving to tap the ledge exposed in the old incline, has been going ahead nicely until recently, when broken ground was encountered, necessitating timbering. As there is considerable timber on their ground, this difficulty will soon be overcome. The Woodside has invested in a new air compressor and several Burleigh drills, and in future, prospecting in that valuable property will not be so slow.

WASHINGTON.

FIRST THOUGHT.—Okanogan Outlook, Jan. 7: A rich strike is reported in the First Thought. In the drift on the footwall of the ledge in the lower workings, a chute of ore was encountered, assaying from \$700 to \$800 per ton. Since starting up a little over a year ago, the First Thought has been developed to the extent of some 6000 feet in tunnels, drifts and crosscuts, and has, undoubtedly, a larger amount of ore in sight than any two other mines in the county. Superintendent Fisher has received notice to shut down development operations. It has been the custom of the company to suspend work during the winter months.

MINERS MEETING.—Lack of space prevents our publishing accounts of the meetings held in various counties for the purpose of appointing delegates to the State Mining Convention. In most cases amiable resolutions have been adopted and earnest men appointed.

MECHANICAL PROGRESS.

American and English Rolling Mill Work.

A Scotch iron worker, who recently visited the Homestead Works of Carnegie, Phipps & Co., in Pennsylvania, and saw the enormous amount of work done, said: "If I were to go back to Scotland and tell them there what I have seen to-day, they would tell me very quickly that I was 'gaffing' them. You roll just four plates while we roll one in the old country. Another important thing is that you need not get your steel so hot as we do at home. You must know that in our plant we use soft rolls, and it is absolutely necessary to bring the steel to the rolls with a dripping heat so that no foreign particles may cling to the surface of the ingot and thus indent the rolls. It is also necessary to scrape the bottom of the ingot or slab before it is pressed through the rolls. There is no use denying the fact that you Americans have left us far behind in the iron and steel mills."

When one whose interests are so materially affected, makes such an admission, there seems to be little room for doubt as to the superiority of American industry and enterprise, and very little occasion for prejudice against American products. Such comparisons, however, should not be made with a view of decrying the merits of one in order to show off to advantage the merits of another. Every machine or process should stand on its own merits, and any superiority should be accepted as an object lesson to teach better make or practice to the one which is inferior. American machinery and processes may be superior at some points to those in Europe. On the other hand, Americans may learn much from the old country. The rivalry between us should be open and fair. We should be willing to give and take. In no other way can we better make progress.

Something Further About Steel.

In our last issue, we gave an article from a correspondent of the *American Machinist* headed "An Interesting Experiment with Steel." In the next number of the *Machinist* we find the following criticism upon that article from the pen of S. W. Goodyear:

Under the heading, "An Interesting Experiment with Steel," in the *Machinist* of Nov. 12th, are some statements which, in my "rule of thumb" way of treating the steel question, I wish to hold up to the light—that is, to such light as the plain, practical steel worker can comprehend. That steel is such in consequence simply of a "combination of iron and carbon" is not or need not be "the universal idea."

Steel may be as truly steel with practically no carbon combined as though it had combined the highest percentage possible. The question, What constitutes steel, as distinguished from iron, is not to be settled simply by the presence or absence of carbon. Steel may be adjudged to be iron, because heating to hardening heat and suddenly cooling utterly fails to harden it. Iron may be called steel simply because it does harden readily under the same treatment to which hardening steel responds, and still the soft, nearly carbonless steel is just as truly steel, and the hard, highly carbonized iron is just as truly iron as though the test of hardening had shown what might be expected.

It is a question of structure, not a question of carbon.

For certain uses, it is necessary or desirable, to say the least, that steel should contain certain percentages of carbon, the exactly right amount naturally insuring, under proper conditions and treatment, the best results; but that "two per cent of carbon" exists in "steel wire nails" and "iron cut nails" must strike those who had supposed that something was known of the make-up of steel and iron in the light of a new discovery. Two per cent! What can be meant? That would be too high for tool steel. More than twice as high as the average of tool steel in general use!

"When steel is heated, the atoms of carbon have a tendency to unite, and form comparatively large particles; when slowly cooled, these particles remain large; but on being chilled, the molten particles are shattered to atoms. In this way, the surface area of diamond presented to iron may easily be increased from ten to one hundred times. With this increased surface, contact, and the more thorough diffusion, it is not difficult to understand why steel should harden on being chilled."

I believe the above to be accurately quoted. Now, as a statement of facts, in my judgment, the judgment based upon much experience and observation, I say, only when heated efficiently to produce such result, to the first statement; and to the second, only when chilled from a right heat; and as to the third, i. e., the assumption that the phenomenon of hardening is explained by the alleged fact that chilling breaks up the larger particles, and produces a finer condition, I say, unsupported. At a right heat, there will be produced by chilling, by hardening, the promised fine condition, with hardness. At a higher heat, there will be as great hardness, but with it will come coarseness, a disorganized, uneven structure, as unlike the other as it is possible to conceive—the one as fine as flint, and as beautiful as a diamond, the other as coarse as pig iron; both the same material, different parts of the same piece,

if you please, so that to say "heating and cooling slowly or quickly produces certain results, needs to be modified. Question of, how hot? comes into the account.

As to "arrangement of diamond particles in temper drawing as shown by color." Hardening does that arranging. Tempering, by many, is believed to change the grain, size of "particles." I don't believe it. So again annealing softens, by many is believed to mean necessarily changes the grain, makes the particles coarser. I don't believe that either. That it often does, I know; that it is necessary in order to soften, is another thing. Hardening at proper heat—at the refining heat—will produce the much admired, even grained condition of fineness referred to. So will working properly at proper heat; so will cold working. No, no, we cannot settle the question of why steel hardens in this way. Let's have proof which proves.

CULLOM'S CAR COUPLER BILL, to which we alluded in our last issue, seems to be attracting much attention, not only among railroad circles, but among the general public as well. The necessity for some uniformity and better service in regard to the coupling of cars is enforced by President Harrison in his recent message to Congress by a reference to the great loss of life resulting from inefficiency or carelessness in this direction. The President, in calling attention to the great loss of life in the railway service of the country, refers to the fact that during the year ending June 30, 1890, 369 brakemen were killed and 7841 maimed while engaged in coupling cars. The total number of employees killed from all causes during the year was 2451, and the number injured 22,390. This, he holds, is a cruel and largely an extra sacrifice. The Government is spending nearly \$1,000,000 annually to save the lives of shipwrecked seamen; every steam vessel is rigidly inspected and required to adopt the most approved safety appliances, and he expressed an opinion that a law requiring of every railroad engaged in interstate commerce the equipment each year of a given per cent of its freight cars with automatic couplers and air brakes to be used, would very soon and very greatly reduce the present fearful death rate among railroad employees.

THE DOUBLE BELT QUESTION.—It may seem strange, says a contemporary, that a double belt should be so much more effective and durable than a single one, the surface contact being the same in both cases. One cause of superiority is that in a double belt a weak spot in the leather of one belt is likely to be covered by a stronger part of the other belt, and thus prevent the weak spot from stretching and forming a curve. The main cause of excellence is that in a double belt the limit of elasticity is not so easily reached. When the elasticity has gone from a belt its life is ended. When at work a belt stretches out in length, producing a slack side, which is best shown in a horizontal position, as from the line shaft to the counter shaft, and when the load is thrown off, the belt recovers itself unless the limit of elasticity has been reached. Elasticity consists not alone in stretching out. There must be a tendency to pull back.

CURIOUS KNIVES.—When Sheffield first became famous for its cutlery, a peculiar-shaped knife, designed for a variety of uses, was made with great care and sent to the agent of the Cutler's Co. in London. On one of the blades was engraved the following challenge:

London, for thy life,
Show me such another knife.

The London cutlers, to show that they were equal to their Sheffield brothers, made a knife, with a single well-tempered blade, the blade having a cavity containing a rye straw 2½ inches in length, wholly surrounded by the steel; yet, notwithstanding the fact that the blade was well tempered, the straw was not burned, singed or charred in the least. It is needless to add that the Sheffield cutlers acknowledged themselves outdone in ingenuity. —*St. Louis Republic*.

AN UNEXPLAINED PHENOMENON.—At a recent meeting of the Iron and Steel Trust in England, a member showed that the interior of a piece of mild steel may be raised to the fusing point while the outside remains solid, just as if one were to try to melt an iron tube, closed up at each end and filled with some metal of a lower melting point than iron, in which case the heat would penetrate through the iron and liquefy the interior long before the tube itself would be affected. The member showed some curious specimens of shells of crop ends and other pieces of scrap steel, which had retained their exterior form, although about two-thirds of the original mass had melted out. No explanation of the phenomenon was offered.

LUBRICATING MACHINERY.—No oil has been made, says a contemporary, that can economically lubricate all the journals of a mill. An oil running a heavy Corliss engine would not do to run a spindle or a fast-revolving dynamo. The former runs slowly and has great pressure and strain on its journals, and consequently requires an oil which will not spread too quickly, but with low gravity and high viscosity. The latter needs a pure mineral oil, viscous and quick, to enable it to enter into the closest parts of the bearing as rapidly as the speed at which it revolves necessitates.

SCIENTIFIC PROGRESS.

Heat and Electricity.

Their Influence Upon the Body in Health and Disease.

Dr. J. D. Bonnar recently read a very interesting paper before the Buffalo Electrical Society, from which we summarize as follows:

The cause of sun heat is generally considered due to the passage of the light rays of the sun through our atmosphere. Light, heat and electricity bear a striking relation to each other; in fact, they are convertible terms—either may be converted into the other. Heat and motion are also interconvertible. This latter statement is true of matter, whether in masses or in molecules. Chemistry also shows that the combination of substances having chemical affinities for each other produces heat.

To go back to our starting point, viz., that the sun is the origin of all heat, and also of all light. We are told by astronomers that the sun is a great molten mass. From our own experiments, we learn that all bodies which combine chemically with each other have certain opposite electrical conditions, and they unite with each other, producing an electrical current, which may be conveyed along wires to distances remote from the place of origin. We find that the electrical conditions are in definite and constant proportion to the attraction or force with which bodies seek to combine with one another. Hence, may we not justly conclude that in the sun the same conditions control the chemical combinations continually going on in its structure? If we are justified in this inference, then we are also justified in the assumption that electrical attractions between the bodies entering into combination are set up and currents sent in all directions throughout the solar system, and only producing light and heat when they reach the atmosphere which envelopes the earth. The currents of electricity are met by the resistance of the atmosphere, which is a very poor conductor of electricity. Hence, we have both light and heat, which we know are produced by electrical currents, when transmitted through bad conducting media, such as platinum wire or bamboo cane, and just in proportion to the resistance offered in the track of the electrical energy. The diffused light of day can then reasonably be regarded as the fruits of the infinitely great number of electrical rays passing from the sun through the resisting atmospheric media. When the air is full of moisture, the day is darker, due, no doubt, to the well-known fact that moist air is a much better conductor of electricity than dry air, presenting, as it does, much less resistance to the electrical effort to reach the earth.

The sun "might be looked upon as a huge battery," in which the elements are constantly combining and decomposing, and thereby originating or generating electrical rays.

Heat and electricity are so intimately related, as to be, in fact, an offspring the one of the other, and it often tests the discernment of the most astute reasoner or observer to tell which is the parent power. Coincident with an increase in the electrical potential in the human body, or part of the body, there is also an increase in the heat of the same, and when our bodies are in a highly electrical condition, or in high potential, we are warmer than when the potential is lower; so, therefore, we find people more vivacious and merry in dry and bright weather than in damp conditions of the atmosphere. By means of the moisture, the electrical potential is lessened. Again, we find that in all inflammatory conditions there is an increase in the positive electricity, so we treat inflammation and all diseases which show increased activity in a part, by applying the positive pole over the affected part, or, conversely, in affections where there is a deficiency in the normal activity, we reverse the electrodes, by applying the negative over the seat of the disease, while the positive is applied at some point remote from it. Thus, we strive to bring about a physiological, natural and normal state of equilibrium.

A simple contrivance shows that the electric current flows from the metal of higher to the one of lower potential, as heat from a higher to a lower temperature, and the same is true in animate bodies as in the inanimate metals. How often have we all noticed that there is a peculiar sensation, or, in fact, a slight shock, experienced when we shake hands with some people, the cause being simply, that the electricity of higher potential in one is flowing over to the other of lower potential. Hence, we infer that the uses of heat may be similar to those of electricity in the cure of disease; in fact, we are using this heat agent vastly more often than electricity, because its character and effects are vastly better known.

WHAT THE BUZZ OF A BEE SAYS.—In a recent work on the bee, T. W. Coman states that the insect can draw 20 times its own weight, can fly more than four miles an hour, and will seek food at a distance of four miles. By a beautiful mechanical adaptation its wings bear it forward or backward, with upward, downward or suddenly arrested course. Its threefold voice organs are the vibrating wings, the vibrating rings of the abdomen, and a true vocal apparatus in the breathing aperture or spiracle. The buzz is produced by the first

two, and the hum, which may be "silly, cheerful or colloquially significant," by the vocal membrane. A number of the bee's notes have been interpreted. "Hummm" is the cry of contentment; "wuh-uh-nuh!" glorifies the egg-laying of the queen; "shn-n-n" is the note of the young bees at play; "s-s-s-s" means the muster of a swarm; "b-r-r-r" the slaughter or expulsion of the drones; and the "tn-tu-tu" of the newly hatched young queens is answered by the "qua-qua-qua" of the queens still imprisoned in their cells.

WILL IRON RUST CAUSE FIRE?—When oxide of iron is placed in contact with timber excluded from the atmosphere, and aided by a slightly increased temperature, the oxide will part with its oxygen, and is converted into very finely divided particles of metallic iron having such an affinity for oxygen that, when afterward exposed to the action of the atmosphere from any cause, oxygen is so rapidly absorbed that these particles become suddenly red hot, and if in sufficient quantity will produce a temperature far beyond the ignition point of dry timber. Wherever iron pipes are employed for the circulation of any heated medium, whether hot water, hot air, or steam, and the pipes are allowed to become rusty, in close contact with timber, it is only necessary to suppose that under these circumstances the particles of metallic iron become exposed to the action of the atmosphere—and this may occur from the mere expansion or contraction of the pipes—in order to account for many of the fires which periodically take place at the commencement of the winter season.

ASBESTOS RUBBER, as it is called, is quite a new article of manufacture, which is fast coming into general use. In its preparation, asbestos and india rubber woven sheeting, for instance, consists of asbestos woven cloth, coated on both sides with india rubber and then vulcanized. It is used as a substitute for the asbestos millboard for packing for steam joints, and in other situations where it is desired to resist both heat and moisture, while affording a high degree of elasticity. Asbestos and india rubber woven washers are also made, and asbestos and india rubber woven tape, for making steam and water joints. Asbestos rolled cloth packing is also made, both with and without india rubber core. Asbestos block packing consists of an india rubber back, upon which there are built up edgewise a number of layers of asbestos cloth. Sufficient elasticity is thus imparted by the vulcanized rubber back, while great durability and protection to the rubber is insured by the use of asbestos.

A NEW ARTIFICIAL STONE, recently devised in Germany, is prepared as follows: Ten parts of silicic acid, powdered and freed from impurities, are mixed with 90 parts of water and 100 of quicklime, all by weight. One hundred parts of the product are mixed with 100 parts of sand and five parts of magnesia or fluorspar, and the mass moulded as desired. The articles are allowed to dry for 12 to 24 hours, and subjected to steam pressure under 10 atmospheres pressure for 48 to 72 hours, after which they are treated with boiling saturated calcium chloride solution at a pressure of 10 atmospheres for 6 to 12 hours. They may then be dried by air or the circulation of steam. Marble, magnesia, magnesium limestone, etc., may be substituted for the sand. The stones thus formed are said to resemble marble, sandstone, granite, etc., closely, to be fireproof, and to resist the action of the weather as well as natural stones.

THE WASTE OF ENERGY IN ARTIFICIAL LIGHT.—The correspondent of a foreign paper, the name of which is lost to the writer, says: "All our lighting methods consist in heating a body to a higher temperature. When a degree of over 500° C. has been reached, the vibrations produced by the heat become visible to our eye as light, red or dark rays. With increasing temperature we finally reach a white light; but what a great amount of energy has been spent and lost! Certainly our lighting methods are very primitive, and it would seem that the electrical light would easily attain supremacy. Of all the energy consumed in a gas flame we get only one per cent returned in the form of light, the 99 per cent being lost as regards light. The electric arc light stands higher in this respect. Still, it only gives us ten per cent back in the form of light, of all energy spent. Surely we cannot be proud of our lighting methods."

THE HEIGHT OF THE AURORA.—Interesting particulars concerning attempts to measure the height of the aurora have been given the Royal Danish Academy by Adam Panlsen. At Godthab, with two theodolites four miles apart, the height of different auroræ was found to range from one-third of a mile to nearly 40 miles. Near Cape Farewell, with a base line of about three-fourths of a mile, the results showed them to range in height from one to 10 miles, and at Spitzbergen, with a base line of about one-third of a mile, they were shown to be from 300 yards to 18 miles high, according to brilliancy. M. Panlsen infers that the aurora only appears at a considerable height in the temperate zone, while in the arctic zone proper the phenomenon is generally produced in the lower atmosphere.

IRON PIERS.—An ocean pier at Puerto-Colombia, near Savanilla, will, when finished, be 4000 feet long, built entirely of iron and steel, with a double line of rails.

ELECTRICITY.

Electricity in Mining.

Much is now being said and done in the matter of introducing electricity into the various departments of mining. On the Pacific Slope, on other parts of this continent, and in various parts of Europe, electrical energy has been largely applied to mining, and in most cases with the most unmistakable success. Perhaps more is being done in this particular direction in England than in any other country, and the subject is largely discussed there in various scientific bodies, and especially in the Institute of Mining Engineers.

Electrical transmission of power constitutes the chief factor in these discussions, and that plan has been adopted in a large number of localities, but generally over short distances only. The recent successful long distance transmission at Frankfurt, in Germany, is attracting still more attention to the subject, and opening much more extended fields for its introduction.

Metalliferous mining in particular, from the very nature of its usual localities and surroundings, is very generally much hampered by long distances over which coal for fuel has to be conveyed or the very unsatisfactory and often expensive substitute of wood employed. When the fact is taken into account that nearly all mining on the Pacific Coast is carried on in the near vicinity of an abundance of water power, the great value of the electrical transmission of that power from the rivers to the mines should become at once apparent.

The improved and more economical conditions under which such transmission may now be made, makes that system peculiarly valuable to this coast, and it can scarcely be questioned but that great numbers of electrical plants of that description will soon be introduced. Such convenient and cheap power will no doubt soon open up many valuable mining properties which are now, for the lack of such means, lying idle and unproductive. When a turbine can, with very little expense, be made a source of almost unlimited power, the advantages of electricity are of great value. The cost, under such advantages, between steam and electricity are very largely in favor of the latter.

The fact that new machinery and new methods for cheapening and facilitating work by electricity are being so constantly brought forward, is no doubt greatly retarding the introduction of this new power; but in this era of rapid progress, it can scarcely be considered the part of wisdom to sit down and wait for the perfect completion of anything. We should rather take up the most improved as soon as we are really in need of it.

The mining engineer of the future and even of the present, who is not also a thorough electrical engineer, will soon be left behind in the race of progress. The time is fast approaching when he who from ignorance or from a lack of proper enterprise and boldness, neglects to take advantage of what is placed before him in the way of progress, will utterly fail of success in every enterprise in which he may engage. In the actual presence of the voluminous contributions of literature and practical development on every economic or industrial subject, there is no excuse for ignorance or uncertainty. This country and this coast even, should, in the near future, become the great practical school of mines for the world. We have here every description of mineral which the world produces, on anything like a large scale, and we should be quick in the future, as we have been in the past, to adopt the newest and most improved methods, and our inventors should be constantly on the alert to devise new and still further improved means. It is confidently expected that professional interest in such matters will continue, as it has in the past, to bear satisfactory fruit in all circumstances under which such efforts may forward scientific advancement or industrial progress in any direction.

Running Railroad Trains by Electricity.

The proposition that long-haul service, on even overland railroads, may soon be accomplished by electricity is fast gaining ground among men who are largely interested in and intimately acquainted with heavy railroad operations. We have now the following opinion on this matter from the President of the Northern Pacific Railroad:

"It is easier for me to have faith in the invention to run railroad trains by electricity than it was ten years ago to believe that it was possible to run street cars in that manner," said Second Vice-President Prescott of the Northern Pacific Railroad Company in a recent talk on Edison's latest device, in which Henry Villard has become interested. "I think it was about ten years ago," said Mr. Prescott, "when Mr. Villard told me that I would see the day when street cars would be operated by electricity. I doubted very much, as it was impossible for me to see how it could be done."

"Since I have seen street cars in operation by electrical appliances, I am ready to believe that it is only a question of time before we will have it on the railroads. The question as to the disposal of the present supply of engines does not cut any figure in the matter and will

not be taken into consideration. If you can get a cheaper motor power than that which you are using, you would not begin to calculate how much money you had expended on the old one, would you? What would we do with the old engines? I don't know. Probably sell them to some one who did not want electricity. If everybody used electricity, it might be hard to find a market for the engines. If no other disposition could be made of them, they could go to the scrap heap; but I don't think the present stock of engines will be sold for old iron."

THE TELEPHONE PATENTS.—Much has been said of late, and much confusion manifested, in regard to the expiration of telephone patents, and the benefit which the public will derive from their expiration. A full and, no doubt, correct statement of all the facts in the case has been put forth as follows: The fundamental telephone patent will expire in 1893, when the simple method of transmission by magneto currents will be open to the public. The practice of extending the term of patents is one which has fallen into disrepute, and nothing is more improbable than that it would be revived in a case like the telephone. The inventor of the telephone has been enriched for his gift to the public, and deservedly so. With this fact established, the chances of extension fall. It must be remembered, however, that the telephone industry of to-day has only attained its present degree of perfection by the coalition of many improvements upon Bell's basic idea. There are hundreds of patented inventions which have been acquired by purchase, which will inure the Bell Telephone Company quite a firm grip on the business for many years after the fundamental patents expire. First in importance are the microphone patents and the induction coil for raising the tension of feeble microphone currents; and, secondarily, numerous switches, switchboards and systems which enable the present company to give good service. A competing company can only offer the public magneto transmission minus these improvements, which, of course, will give only inferior results.

ELECTRICITY AS THE RIVAL OF STEAM.—Dr. Louis Bell, in a paper on "Electricity as the Rival of Steam," before the Franklin Institute, recently concluded as follows: "Probably for a long time to come by far the greater proportion of dynamo will continue to be driven by steam engines, but so far as use at a given point is concerned, the electric motor is a most successful rival of the steam engine. If the day ever comes, as it may, although we can hardly dare to look for it, when we can obtain electrical energy directly from coal, as we now obtain heat energy, the days of the steam engine will be numbered. As I have already pointed out, electricity and heat are very intimately connected. Every time we heat a piece of iron, for example, we stir up not only what we call heat, but also electro-magnetic energy, which is the form in which heat is radiated, and if we go on heating long enough, we may raise the iron to a white heat, and recognize the energy in its familiar form of light. But all this is merely a dream of the future; perhaps it will be fulfilled some day; but until then we must depend upon our present dynamo."

THE FRESNO ELECTRICAL RAILWAY CO.—Articles of incorporation have been entered into by this company and officers elected as follows: Marcus Pollack, president; Dr. Lewis Leach, vice-president; J. R. White, treasurer and Maurice Messinger, secretary. The capital stock is \$1,000,000. The new company has bought the three lines of street railway, and will at once construct 12 miles of electric road in this city. As planned, the road will soon be extended through the colonies and to Hanford, a distance of about 30 miles.

ELECTRICITY IN THE NORTHERN PACIFIC CAR SHOPS.—It is stated that E. B. Pareone, superintendent of construction for the Edison General Electric Light Company of Portland, Or., has just finished installing an Edison plant for the Northern Pacific car shops at the town of Edison. The station comprises four No. 10 Edison dynamos, and about 1000 arc lights, distributed through the various shops and departments. Two turn-tables have also been equipped with Edison dynamos.

NEVADA CITY.—The Board of City Trustees last week awarded a contract to K. Casper, for lighting the streets for one year with the Helmer incandescent electric light system. The plant is to be erected immediately. Gas has heretofore been used.

ELECTRIC LINE EXTENSION.—The announcement has been made that an important extension will soon be made by the Capital City Railway Co. of Salem, Oregon, which will give that city eight miles of electric city railway.

THE MAGNET, equipped by the Pacific Electrical Storage Company of this city, which has been running in San Francisco bay for some time, is, we believe, the first electrical boat built or run upon Pacific Coast waters.

THE POINT DEFIANCE LINE, at Tacoma, has been equipped with electricity, and several electric cars are now running regularly on that road. The electric power is furnished by the Tacoma Railway and Motor Company.

GOOD HEALTH.

Specks Before the Eyes.

Their Sudden Appearance—A Startling but Not Serious Affection.

People are often frightened almost out of their wits by the sudden appearance of flying specks before their eyes; sometimes they are only one or two, but often thousands of them can be seen, particularly when a person looks toward a white surface, as white clouds, white houses, white pavements, or toward water surface. These flying specks are mostly small points, connected one with another by fine lines, and the points often present a headed appearance. At first, persons are likely to try to knock them away, thinking it is something before their eyes. They come usually in both eyes at the same time. They may diminish or increase in numbers at times, but rarely ever disappear entirely. They never interfere with vision by settling over objects looked at.

Dr. A. D. Williams explains, in the *St. Louis Medical Journal*, that the nature of the flying specks here described is not well understood, but badly focused eyes are most likely to be troubled with them. He says that they signify nothing serious so long as they are mere points connected with fine lines, and do not interfere with the acuteness of vision. Treatment is more than useless. If the eyes are out of focus, proper glasses should be selected. It is important that the patient should ignore their presence entirely; should avoid seeing them as much as possible and let them alone. Large floating masses before the eyes, which swim around and often obscure vision, are the result of serious disease, and should be promptly looked after.

CRIMINALITY AS A DISEASE.—"It is my opinion that the time will come when criminality will be recognized as an inherited disease and treated accordingly," said a man who has recently been studying this subject somewhat carefully from a medical standpoint. "Those persons who display in youth a tendency to commit crimes will then be placed in institutions very different in character from prisons, where they will be constantly watched and encouraged to employ their abilities in those kinds of labor for which they are best fitted. In this way society will be saved from the consequences of the vicious instincts of these people. In many cases careful treatment will doubtless cure criminals of their disease and enable them to return to the world and become useful citizens. In others, they will have to remain under surveillance during the whole of their lives. Of course, men and women not afflicted with vicious tendencies at birth will still be subject to temptations, and the law will be obliged to inflict penalties upon them for irregular proceedings; but the large class of inveterate lawbreakers will be recognized as irresponsible for their ill-behavior, just as people afflicted with hereditary diseases are never blamed for misdeeds."

CHANGE OF ACTION BETTER THAN REST.—As for the feeling that we need rest, rest, rest, it is often a fallacious one. It is action which makes muscle. The spirit of life enters into us when we take a vital part in to-day. Often we suffer from rest. A change of occupation is what we most need, as a rule, and the relief hours of an active person turn out to be very intelligent, easy and contemporary. We meet rest, but we must not lose our electricity, which the will, the thought can command at all times, and which ought to be on guard like an orderly, to summon us when we should become alert. Headaches evaporate if we meet exert ourselves for those we love, or we almost forget the pain, which is the same thing; and ill-temper cannot flourish unless we have idleness in which to reflect upon the motives belonging to some one else. With energy leading the way, ennui lifts from the horizon, and we see color and distance again. There are women who labor day by day in hunger and despair. It seems as if other might labor in comfort and health, instead of sitting down to lassitude and elgbe.—*Ex*

RUBBER FOOT FEVER.—If a man has a corn, says the *India Rubber World*, it can be removed, but if he is suffering from rubber foot fever, no chiropodist can help him, and the only thing to prescribe is liberal bathing of the feet and removal of the cause. Rubbers should only be worn to keep wet out, and they should be removed the moment the wearer gets indoors. Failure to note this gives a man wet feet in a far worse sense than if he had waded through mud ankle deep. It was the trouble resulting from forcing the perspiration to soak the stockings and keep the feet perpetually damp that drove rubber-soled boots out of the market. Even loose rubbers are a source of danger and the cause of many more serious colds than they avert.

DISEASE FROM BIRDS.—One of the latest discoveries of the scientists is that the germs of yellow fever may be conveyed from tropical countries in the plumage of birds.

STEEL FOR COPPER.—It is reported that a large steel company is experimenting with a process to render steel efficiently tenacious to enplant copper for the manufacture of rods and wire.

USEFUL INFORMATION.

A CURIOUS MINERAL.—Quite recently a large deposit of what is sometimes known as "foal flour," has been discovered in the State of Maine, and that, too, of such purity as to arouse the wonder of the best analysts. In investigating the properties of this new earth, one is impressed at once by its wonderful facility for resisting the action of acids, alkalis, oils, and especially by its remarkable quality as a nonconductor of heat. A simple test of this latter quality, made by one interested in the company, was to take an incubator of the material and place it on a bar of iron. The iron bar was then put in a blacksmith's forge and heated until it was melted away from the incubator. So little did the heat penetrate this incubator that one could easily place the fingers upon the upper part of it without inconvenience from the heat. Foal flour is almost as white as oxide of zinc. It is so light in weight that a flour barrel of it in its natural condition will not weigh over 50 pounds. It is, as we have already stated, absolutely unaffected or unchanged by any sort of mechanical manipulation, by acids, alkalis or heat. As it is mined, it comes out of the ground a pure white powder, so fine that it cannot be ground any finer. A careful analysis of it shows about 95 per cent pure silica. This kind of earth has been used in Europe very largely for a variety of purposes; one of the most curious of which was in Sweden, where the poorer classes mined it and mixed it with wheat flour, in order to make bulky loaves of bread, not for sale, but for their own eating.—*American Miller*.

REMARKABLE SKILL AT STONE THROWING.—It is supposed that we have no men nowadays who could compete on even terms with the old archers. A man named Uri Bailey, recently died in Pennsylvania, who was worthy of a place with the old-time soldiers. His skill in throwing stones was said to be marvelous. He was mentally deficient, but a giant physically. His aim with stones at any mark or game was as unerring as that of the most skillful handler of the rifle. He annually bagged scores of small game, pheasants, rabbits, quails and squirrels, which he killed with stones. He could kill a bird on the wing or a rabbit at full speed almost as easily as he could kill it at rest. He had a large leather pouch attached to one side of his coat, on which he on all occasions carried a good supply of carefully selected stones. An exhibition of his skill which was always a favorite with him, was to set up a scythe blade, edge toward him, and at the distance of 100 feet out apple in halve by throwing them against the edge of the blade. He could almost exactly halve two out of every three apples he threw. Robin Hood's great feat of skill was to set up a peeled sapling at a considerable distance and split it with an arrow. We do not see that this is more difficult than splitting the apple on the scythe blade.—*Ex*.

PURIFYING GUTTA PERCHA.—Gutta Percha as it comes in commerce is a very rough and crude article. It is reported that a Frenchman has discovered a means for purifying this material which will revolutionize completely this branch of the business. The work has heretofore been done by mechanical operations; while the new method is chemically performed, and while it is a much cheaper process, the results in the gutta percha are much more satisfactory. The raw gutta percha is first dissolved in a suitable solvent and afterward removed by the filtration of the undissolved matter. This solution is then passed into a series of poisoning vessels, and the oxidized gutta percha separated from the pure material by reason of the difference in density. The pure product is drawn off into another vessel, and the bisulphide evaporated. The resulting material still contains resinous products which require to be removed. This is done by dissolving in benzine, when the resin and gutta percha separate, and each may be drawn off separately. The oxidized gutta percha, after being oxidized, is treated in the same manner, forming a product of inferior quality. Electricians, particularly, will profit by this discovery, as gutta percha is a material much used in their profession.

PHOTOGRAPHS, IN COLORS, OF TINTED WINDOWS.—It is said that a Swiss doctor has succeeded, after a long series of experiments, in obtaining photographs of tinted windows in their original colors. His photographs contain red, violet, yellow, green and white. They were sent to Dueseldorf, after passing from hand to hand on the way, and the photographic journals speak favorably of their retention of the colors. These samples were taken in 20 seconds by the midday sun.

A NOVEL WAY TO CUT SHEET BRASS.—Sheet brass may be cut chemically with good success by the following method: Make a strong solution of biiodide of mercury in alcohol. With a quill pen draw a line across the brass where it is to be cut. Let it dry on, and, with the same pen, draw over this line with nitric acid. The brass may then be broken across like glass out with a diamond.

A NEW FIRE EXTINGUISHER is composed of a mixture of water and liquid carbonic acid gas, which, upon being discharged through pipes at high pressure, causes the rapid expansion of the gas, converting the mixture into a spray more or less frozen.



By the DEWEY PUBLISHING CO.

Office, 220 Market St., N. E. cor. Front St., S. F.
Take the Elevator, No. 12 Front St.

W. B. EWER, SENIOR EDITOR

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Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday, January 16, 1892.

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Passing Events.

In mining circles the main topic of interest has been the coming Mining Convention. It is a hopeful sign for the industry that the general sentiment is in favor of giving the miner a better "show" than he has had. There is a very different feeling on this subject now from what there was ten years ago. The State misses the gold it used to have in circulation when the hydraulic miners were at work. If they can show, as they think, that their industry can be carried on without injuring others, the people will be with them in the future.

A large number of Eastern newspaper people are at present visiting California, in attendance on the Convention of Press Clubs being held in this city. They intend making trips to different parts of the State.

In the mining counties, during the past two weeks, many meetings have been held by the miners. They are anxious to have Congress look into the laws and rulings affecting their industry, so that many of the obstacles to obtaining title to mineral lands may be removed.

JAPANESE, to the number of 100, have taken the places of that number of whites and Chinamen at Comox, B. C., in the Union mines. Two hundred more Japanese miners are expected on the next steamer.

Other Objects in View.

There seem to be many who suppose that the only object the miners of this State have in meeting in convention is to bring the hydraulic mining question to the front again, and that only miners interested in surficial gravel will be benefited. This is a mistake. There are several branches of gold-mining carried on in California, just as there are several branches of agriculture. The gravel miners are not much interested in quartz, and those milling quartz have little interest in the hydraulic-mining subject. The people generally have heard so much about hydraulic mines and debris that they have paid no attention to quartz mines, river mines, or other forms of gold-mining.

They are therefore ignorant of the status of the other branches of the mining industry and know nothing of the difficulties under which these are at present carried on. The miners themselves, however, do know what these difficulties are, and are about to appeal to Congress for relief. The swearing off of mineral land as agricultural, by which large tracts of the mineral domain come into the possession of the railroad companies, is an evil not only affecting California, but Montana and other States. Montana has been agitating the subject for two years past, and the miners there have handed together to right the wrong. They have been only partly successful thus far, but have at last obtained a department decision declaring large tracts mineral temporarily until Congress can act. California has this same subject to discuss, and an exceedingly important one it is for certain of the central and northern counties.

Again, the contests between the mineral and agricultural claimants of public lands, from one end of the State to the other, are usually so conducted that the miner gets the worst of the bargain, and it is very difficult for the miner to obtain title to land that the Government really intended to set aside for his use and benefit. By the methods and rulings adopted, the area available to the prospector is being gradually but rapidly narrowed, greatly to his detriment.

During the last ten years the courts and departments have been placing new and restricted interpretations on the mining statutes until the Act of Congress has been practically nullified. By virtue of these decisions and rulings, the requirement now is, that the mineral claim shall be a paying mine; valuable paying mineral must be proven, and prospective values are not admitted.

Under such rulings as this, many of the prominent mines of California, which have yielded millions of dollars could not be legally located and patented to-day. The law contemplated no such a state of affairs.

Then comes the question of obtaining Government title to mineral lands. The red tape and circumlocution with which the process of patenting a claim has become involved is so great that it is almost impossible to obtain a patent. It takes from three to 15 years to get a mineral patent through the departments. Men are permitting the land to go as agricultural and buying it for mining in that shape rather than try to get a mineral patent.

It has been decided time and time again that a department ruling or decision does not make a law; but the practice is such that the decisions and rulings have really taken the place of the plain law itself.

These are some of the subjects which the miners will discuss at the Convention, in addition to that of hydraulic mining. Those who are opposed to the latter industry try to make it appear that the miners only want to get a chance to work those mines again, and that the Convention will consider no other subject. Most of the other industries of the State have had representatives assembled in convention. The miners meet now for the first time. Those who are opposed to them will do well to suspend judgment until they see what is done. It will be time enough for criticism when the miners ask for something unreasonable.

A ZOOLOGICAL SOCIETY.—An attempt will be made at 2 o'clock on Saturday afternoon, in the Academy of Sciences building, to organize a Zoological Society of California. All who favor the movement are invited to meet Dr. H. H. Behr, Dr. Gustav Eisen, Walter E. Bryant, C. A. Keeler and Chas. Friels on Saturday. These gentlemen are the signers of the call.

The Miners' Convention.

On Wednesday next will assemble in Pioneer Hall in this city, the first general convention ever held by the miners of California. As all interested in the matter know, Placer county held a county mining convention and issued the call inviting the other counties to join forces at San Francisco on January 20th, and consider such matters relating to the mining industry as might properly come before them. The idea originated with Thomas B. Everett and J. A. Filcher of Auburn.

The response to the call is very gratifying. All the mining counties of the State will be represented, and it is expected that 400 or 500 delegates will be in attendance. In some counties people known to be inimical to the mining interests have been appointed by the supervisors, but the call for the convention provided for such emergencies and such persons will probably find themselves ineligible.

Other men are represented as prepared to introduce various plans for overcoming the debris nuisance in the rivers, such as steel V-flumes, etc. It is just as well, however, for all such people to save their breath. It is too late to discuss plans. All this ground has been gone over time and time again, and the convention is not apt to listen to anything of the kind.

As to hydraulic mining the plain facts are these: The debris controversy went on for years; the miners were defeated in the courts and their mines closed by injunction. The people began to miss the gold and the State Legislature asked Congress to investigate the debris question. Congress then appointed a Commission to make an investigation and suggest a plan to adjust the conflict between mining and farming sections and rehabilitate the mining industry.

This Commission has reported that dams will impound the heavy debris, and by improving the rivers the waters will care for the lighter material.

Now the miners want Congress to let them build these dams, without danger of courts enjoining the mines after the dams are finished.

This is the sum and substance of all the miners will ask with respect to hydraulic mines. They will ask nothing unreasonable at all. They will give no advice to the engineers or Congress. They simply want Congress to do what it started in to do—settle the conflict by adopting the report of the Commission appointed to adjust it.

More Valuable for Mineral.

"In the case of William W. Lemon vs. Hugh L. Riant, involving a mineral contest in the Marysville (Cal.) district, Assistant Secretary Chandler affirms the Commissioner's decision, holding for cancellation Riant's homestead entry. The land is more valuable for mineral than for agricultural purposes."

The above paragraph, telegraphed from Washington this week, is refreshing in view of the fact that so many cases are being decided the other way, and so much mineral ground is passing out of the prospectors' field.

Assistant Secretary Chandler, on Nov. 2, 1891, in the case of Tinkham vs. McCaffray, decided that "a contestant who alleges the mineral character of the land that is *prima facie* agricultural must show affirmatively the existence of mineral in sufficient quantity to make the land more valuable for mining than for agricultural purposes."

This rule, combined with that which requires proof of a valuable paying mining ground, adds another to those already operating against the mining claimant. These department rules have about taken the place of the law itself, and will so continue until Congress takes the matter in hand and instructs these instructing officials.

The rulings are made by a set of department clerks and underlings in Washington who never saw a mine. They know nothing of the conditions whatever. They expect a man, for instance, to show valuable mineral which is buried under a couple of thousand feet of lava, before his tunnel reaches the deposit. This is a cold fact, as instanced by several recent decisions, and then, with a sort of solemn facetiousness, talk about the "rainbow chasing features of mining" because the miner is running a tunnel for a deposit he supposes to exist, and wants title to the land before he reaches the deposit.

The Miners' State Convention will bring this

matter to the attention of the Mining Committees of Congress and try and bring about a change of procedure.

The Pelton Wheel With Multiple Nozzle.

The cut shown on page 35 represents the Pelton system of multiple nozzle wheels, by which large power is developed from comparatively low heads, and by which also increased speed can be secured, when desired, for running dynamos or other high-speed machinery. The cut shows only four streams but the number can be increased to six or more, the power being multiplied in this way, according to number and size of nozzles, both nozzles and buckets being proportioned to power requirements and water available.

All the streams having a separate and distinct line of impingement, do not conflict, and there is, therefore, no appreciable loss of efficiency. By this means, adaptation can be made to almost any requirement as to power, under heads ranging from 25 feet upward, affording all the advantages of simplicity, efficiency and small cost of maintenance that applies to the Pelton system under higher heads. Each nozzle has an independent gate valve to facilitate regulation and adapt the wheel to varying supplies of water. Where automatic regulation is desired, the valves, by suitable connections, can be all controlled by one governor.

Wheels of this character have been designed for the great Niagara Falls plant of capacity of 5000-horse power each, running under 140-foot head, discharging 24,000 cubic feet of water per minute, which plans were awarded the prize by the London International Commission against all American competitors. This principle illustrates the remarkable flexibility of the Pelton system of power as well as its facility of adaptation to all conditions of volume, speed and pressure.

The Call for the Convention.

We republish as follows the original call for the Miners' State Convention, italicizing a certain portion to which special attention should be called:

The miners of Placer County in convention assembled, hereby issue a call for a Miners' State Convention, to meet in San Francisco, on Wednesday, the 20th day of January, 1892, at 2 o'clock P. M.

The appointment of delegates to said State Miners' Convention shall be thirty (30) from each county in California except San Francisco, which shall be entitled to 60 delegates.

Said delegates shall be elected by a convention of the miners and mining sympathizers, called to meet in each county on or before the first day of January, 1892, for that purpose. Any three or more miners may issue the call for said County Convention.

If, however, in any county of the State, the miners fail to meet and elect delegates, as herein provided, on or before the first day of January, 1892, then the Supervisors may, and they are hereby requested to appoint the delegates to which their respective counties are entitled to in said State Convention.

Provided, that no man who is unfriendly to the mining interests shall be eligible to a seat in said Convention, and where supervisors may appoint they are requested to discriminate in favor of mining men.

The San Francisco delegation has resolved to pay all the expenses of the Convention, that is, for hall, etc. The Convention will meet in Pioneer hall, Pioneer building, Fourth street, near Market.

A Great Tunnel.

The excoavation of the new Croton aqueduct for the water supply of New York city is of interest to miners, owing to the great amount of tunnel work, and the means employed to overcome the difficulties encountered. The Croton watershed is expected to furnish by complete storage, an average daily supply of 250,000,000 gallons. It was at first contemplated to construct the aqueduct in open cut, but investigation showed that the deep outtings would cost as much as a tunnel. This fact and the consideration of the more permanent character of the work, caused the tunnel to be adopted. Eight reservoirs are included in the project.

The total fall from the Croton gate-house to the Central Park reservoir is 34.39 feet. The aqueduct passes under the Harlem river, where the depth of the center line below mean high water is 307 feet.

There are four blow-offs; total number of principal shafts, 32; total number of auxiliary shafts, 10; shafts to be left open, 28. The deepest shaft (No. 10) is 419 feet.

The total excavated material of the entire aqueduct exceeds 2,500,000 cubic yards. The total excavated material plus the masonry placed exceeds 3,250,000 cubic yards. This is equivalent to 83 per cent of the volume of the great pyramid of Cheops. This material would be sufficient to build a wall 10 feet thick and 55 feet high around Manhattan Island, 30 miles in length on the water front. The amount of dynamite used in blasting on the aqueduct, exclusive of the amount used in sinking the shafts, was over 5,800,000 lbs., or over 2900 tons.

The dimensions of the new aqueduct are as follows:

	Feet.	Miles.
Total length of tunnel not under pressure (horseshoe).....	120,370.6	22.80
Total length of tunnel under pressure (circular).....	38,070.8	6.83
Total tunnel, including siphon at Gould's Swamp.....	158,450.4	29.63
Total length of aqueduct in open trench.....	5,926.7	1.12
Total of aqueduct from Croton Lake gate-house to 136th St. gate-house.....	102,377.1	30.75
Total length of pipe line.....	12,516.0	2.37
Total length from Croton Lake gate-house to Central Park gate-house....	174,893.1	33.12

The flowing capacity of the aqueduct, 318,000,000 gallons per 24 hours, is equivalent to a stream 50 feet wide and 10 feet deep flowing 59.1 feet per minute, or about one foot per second, or about seven-tenths of a mile per hour. These facts we take from a paper read before

the American Institute of Mining Engineers by J. P. Carson of N. Y.

The rocks are metamorphic, principally gneiss, which varies from firm granite to ordinary mica schist. About 90 per cent of the

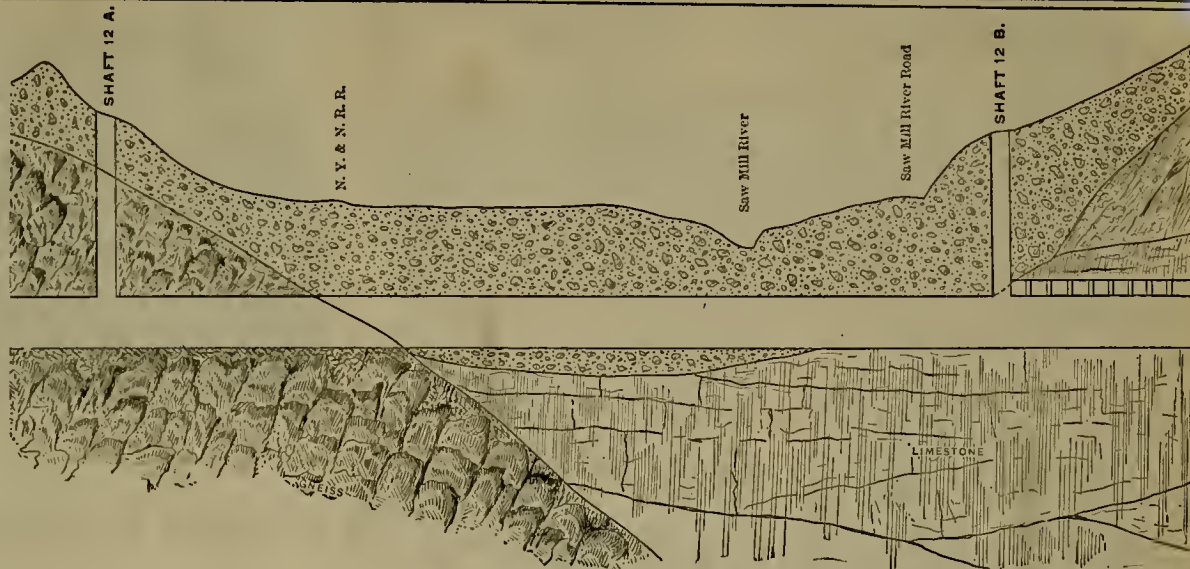


FIG. 1.—LONGITUDINAL SECTION OF AQUEDUCT FROM SHAFT 12A TO SHAFT 12B.

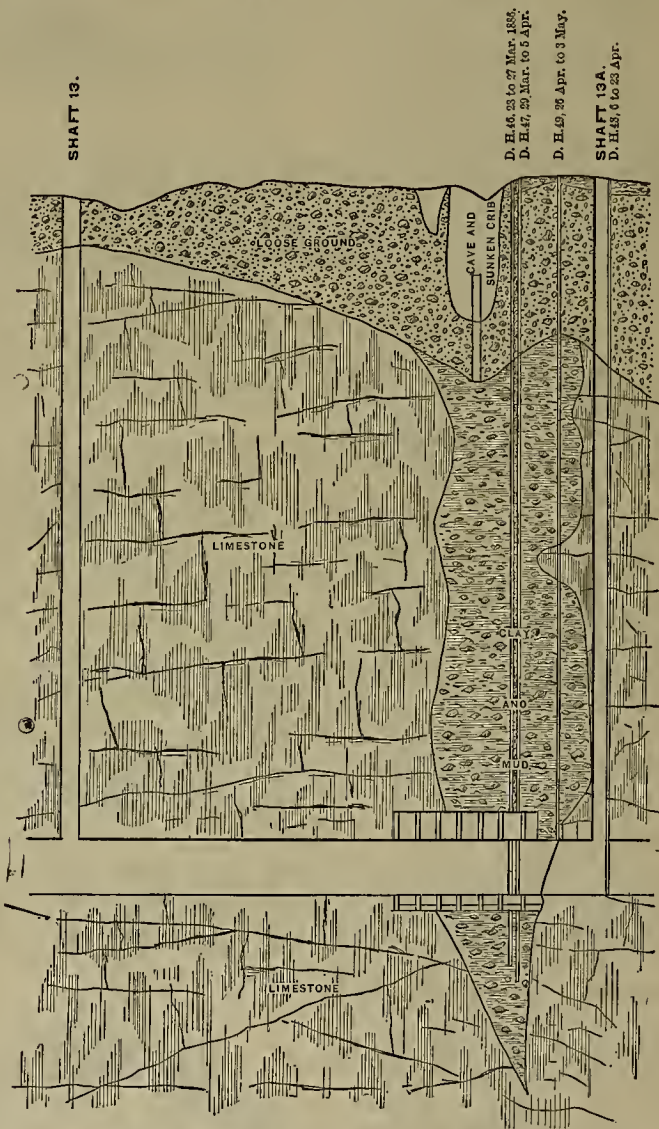


FIG. 2.—SECTION SHOWING BAD GROUND NEAR SHAFT 13A.

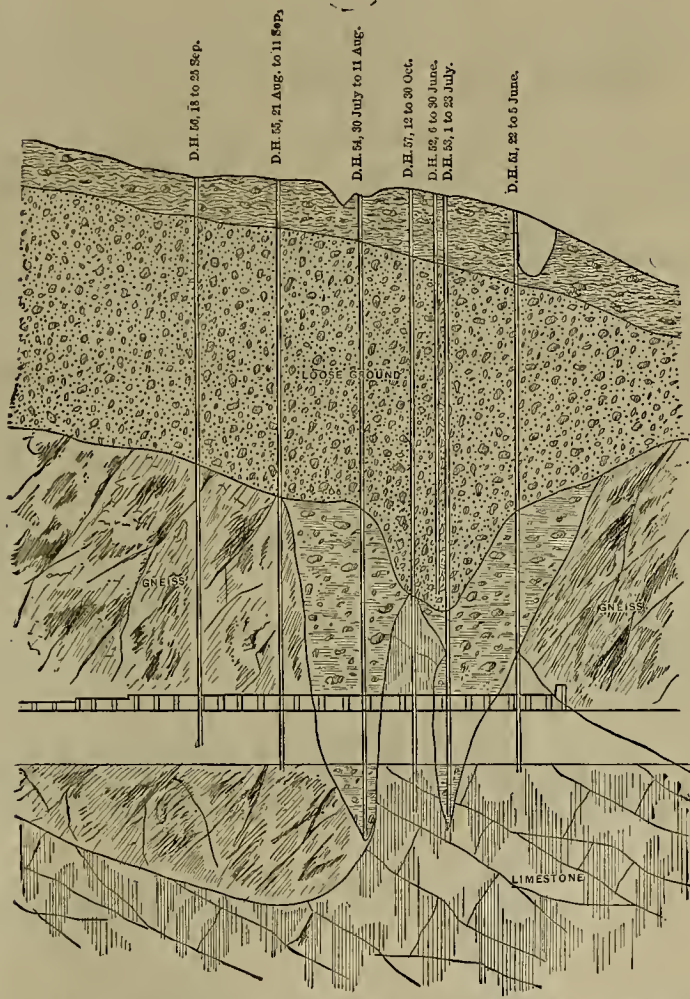


FIG. 3.—SECTION BETWEEN SHAFTS 13 AND 14, AS SHOWN BY DRILL-HOLES.

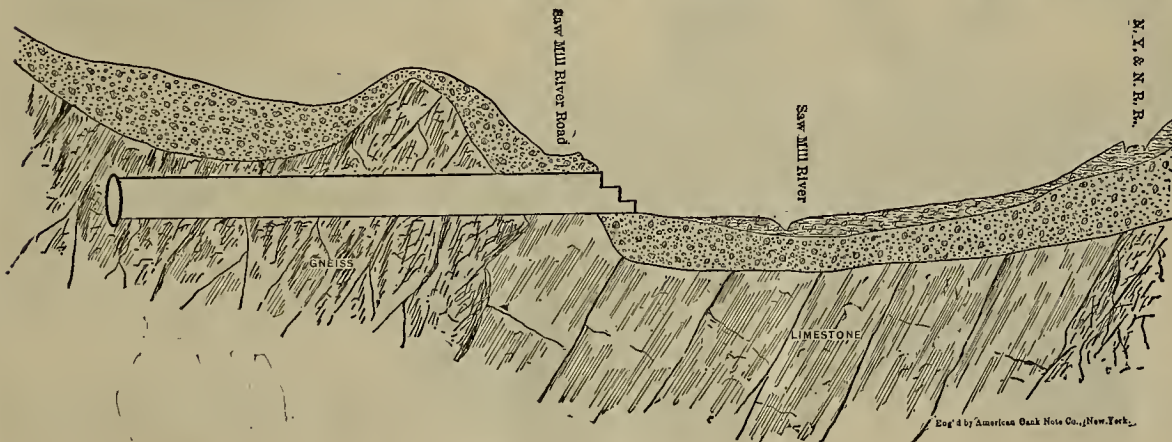


FIG. 4.—CROSS SECTION OF BLOW-OFF CUT.

rock is of this character. It was generally observed that where a brook occurs on the surface, the stratification of the rock below has undergone great disturbance. This is characterized by faults, a jointed structure, and seams of variable size filled with talc, decomposing feldspar and clay. This faulty ground, after a few weeks' exposure to the air, is liable to fall down, by reason of the slacking or swelling of the seams. No interesting mineral specimens were found.

Several pretty bad places were found along the line, and we shall, in a future number of the PRESS, show the methods of timbering employed at such points. To give an idea of the character of the ground, longitudinal sections on the line of the tunnel are shown in Figures 1, 2 and 3, and Fig. 4 is a cross section, taken in the excavation for the blow-off at Ardsley. The longitudinal sections south of shaft B were determined by the diamond drill.

Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY.
Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees, held on the 5th day of January, 1892, an assessment (No. 63) of Thirty (30) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 69 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 5th day of February, 1892, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the first (1st) day of March, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Trustees.

ALFRED K. DURROW, Secretary.
Office—Room 69 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

SAN FRANCISCO MILLING AND MINING COMPANY.
Location of principal place of business, San Francisco, California; location of works, West Point, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of January, 1892, an assessment, No. 1, of Two (2) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 56 Nevada Block, 309 Montgomery Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of February, 1892, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 8th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

CHAS. H. OSBORN, Secretary.
Office, Room 56 Nevada Block, 309 Montgomery Street, San Francisco, California.

GRAY EAGLE MINING COMPANY.—LOCATION OF
Location of principal place of business, San Francisco, California; location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of January, 1892, an assessment, No. 27, of Six (6) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of February, 1892, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 7th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

A. W. BARROWS, Secretary.
Office, Room 11, No. 303 California Street, San Francisco, California.

DELINQUENT SALE NOTICE.

CALIFORNIA CREAMERY COMPANY.—LOCATION OF
Location of principal place of business, San Francisco, California; location of works, Novato, Marin County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of November, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No.	Cert.	Shares.	Amt.
Kaupisch, Julius	3	60		\$2,400 00
Kaupisch, Frank M.	4	60		2,400 00

And in accordance with law, and an order of the Board of Directors, made on the 23 day of November, 1891, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, 111 Front Street, San Francisco, on MONDAY, the 11th day of January, 1892, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with cost of advertising and expenses of sale. CHAS. MERSFELDER, Secretary.

Office, No. 111 Front Street, San Francisco, California.
At a meeting of the Directors of the California Creamery Company, held to-day, the day of sale of the above delinquent assessment was postponed to MONDAY, February 1st, 1892, at two o'clock P. M., at the office of the Company 111 Front Street, San Francisco, California.
CHAS. MERSFELDER, Secretary.
San Francisco, Jan. 11, 1892.

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Mining, Commission.

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DIVIDEND NOTICE.

The German Savings and Loan Society,
528 California Street.

FOR THE HALF YEAR ENDING DECEMBER 31, 1891, a dividend has been declared at the rate of five and four-tenths (5 4/10) per cent. per annum on Term Deposits, and four and one-half (4 1/2) per cent. per annum on Ordinary Deposits, payable on and after SATURDAY, January 2, 1892. GEO. TOURNEY, Secretary.

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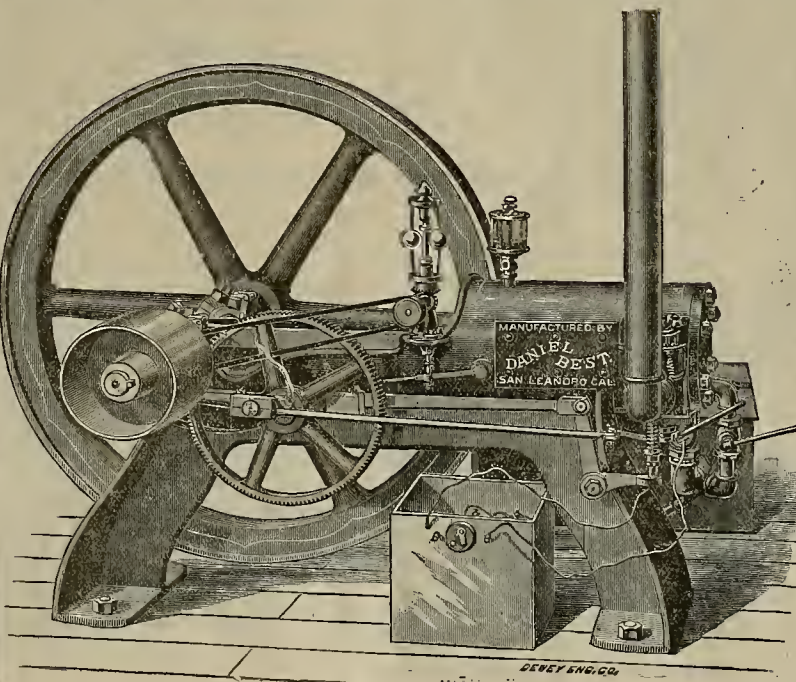
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The San Francisco Delegation.

The delegates appointed by Mayor Sanderson to represent San Francisco at the State Mining Convention on the 20th inst. assembled on Friday last at the State Mining Bureau. They were called to order by Chas. G. Yale, a member of the Executive Committee of the Placer County Miners' Association, which issued the call for the State Convention. He stated the objects of the meeting, and at the conclusion of his remarks, Robert McMurray was selected chairman and W. C. Ralston secretary. Among the delegates present were: Robert McMurray, S. J. Hendy, B. F. Laoy, Judson Wheeler, F. A. Huntington, J. C. Rend, F. Chappellat, F. Relohling, Thomas Price, J. M. Adams, A. Wallrath, M. W. Belshaw, J. H. Hammond, L. Wagoner, J. O. Whitney, S. Foreman, H. Plohor, E. Charonnat, C. W. Cross, P. Deldeshelmer, C. A. Lookhardt, William Ireland, Jr., C. S. Wieland, W. O. Ralston, S. E. Holcombe, Chas. G. Yale, W. Aug. Knapp and E. P. Meroello.

On motion, Chairman McMurray appointed the following committees:

Resolutions—C. G. Yale, O. W. Cross, Ross E. Browne, E. B. Pond, A. J. Bowie, J. C. Rend, W. C. Ralston.

Reception—A. Wallrath, John Hayes Hammond, Thomas R. Church, W. Ireland, Jr., F. Chappellat, P. Deldeshelmer, E. P. Meroello, S. J. Hendy, F. A. Huntington, J. M. Adams, R. McMurray, W. C. Ralston, C. G. Yale.

Hall—F. Chappellat, W. Ireland, Jr., E. P. Meroello.

Executive and Finance—J. C. Stump, John H. Hammond, Thomas R. Church, H. Plohor, J. M. Adams, E. Charonnat, C. S. Wieland, P. Deldeshelmer, F. A. Huntington.

The Chair stated that 42 counties would be represented in the convention, and that about 400 to 500 delegates would be in attendance. It was necessary, therefore, that the San Francisco delegation should take some action for the reception and entertainment of the visitors.

After some discussion, it was decided that the San Francisco delegation would pay the expenses of the convention. A preliminary assessment of \$5 was then made upon each delegate to defray present expenses.

Mr. Yale, of the Committee on Resolutions, stated that he hoped his colleagues would agree with him on the subject of brevity in the resolutions. There was no necessity of extended preambles and resolutions. They wanted to stick exactly to facts, and leave instances for future consideration.

Since this meeting, some of the committees have arranged considerable of their business. Pioneer hall, in the Pioneer building on Front St. near Market, has been engaged. The chairmen of delegations are requested to go to the State Mining Bureau (in the same building) on their arrival in the city and register the names of their county delegations. The entire San Francisco delegation will act as a Reception Committee.

The Grandest of California's Resources.

Among other letters of encouragement received from beyond the borders of California, relative to the mining Convention of next week, is the following:

To the Hon. J. H. Neff, President, Messrs. C. G. Yale, J. B. Hobson, B. F. Hartley, and John Spaulding, members Executive Committee, Miners' Association of Placer Co., California—GENTLEMEN: It was with a deal of pleasure that upon my return from the eastern portion of this State, I found myself honored with an invitation to visit and participate in the deliberations of a representative body of California mining men in Convention to be assembled under your auspices, at the city of San Francisco, Wednesday, Jan. 20, 1892.

While my official duties are of such a character as must needs preclude the entertainment by me of any hope of meeting with you in person on the occasion set forth, let me, as a miner and firm friend of your cause, extend my sympathy and earnest support in aid of the cause you have in hand.

There can be no question that the primary foundation on which your great State has been built up to its present entrancingly wonderful position, was, first the discovery, secondly the development of her wonderful auriferous deposits of pay gravel, from which for years a golden sustenance of practically incalculable value has been derived by her.

Hydraulic mining removed, by the ingenuity of combined antagonism and legislation, left California minus one of, if not the grandest of, her various resources.

It is my sincere wish that the proceedings of your Convention may be resultant in the return to your State and its people of a source of revenue, theirs by right, and in my opinion their richest natural endowment. With great respect, yours cordially,

GEO. A. BETHUNE,
State Geologist of Washington.

OSCAR MALTMAN who established the Pioneer reduction works in Nevada county in 1858, and conducted them until last year, died in this city on Monday.

Notes on the Conebearers of Northwest America.

NUMBER I.

Two Misnamed California Pinus

OAKLAND, CAL., Dec. 28, 1891.

TO THE EDITOR:—There are two species of pine belonging to our conical closed-cone group sailing under false colors—that is, they are bearing in our present pine literature untenable names. I allude to our familiar Monterey pine and the less-known Narrow Cone pine, called botanically *Pinus insignis* and *Pinus tuberculata* respectively. The first was named more than 100 years ago by one of the earliest settlers to deal with California plants, *Pinus Californica*, and the name was so published, the record standing thus:

PINUS CALIFORNICA, Loiseleur, in Nonveau Duhamel, Vol. V., 243 (1816), with a somewhat faint description to be sure, as follows: "Grows near Monte del Rey, New Albion, North America. The cone is of the form of *Pinus pinaster* [that is, narrowly oblong], but was one-third larger in all its parts; leaves in pairs and triplets; seeds of the size of *P. cembra* [that is, about one-half inch long], and good to eat."

The above name and description was republished, 1844, in London's *Arboretum*.

Following are other names which this species has borne:

Pinus tuberculata, D. Don, in Trans. Linn. Soc. XVII., 441 (1837), (a small-coned form).

Pinus radiata, D. Don, same publication, on page 442 (a large-coned form).

Pinus insignis, Douglas, in London's *Arboretum*, 1844, this name being most frequently applied to the species by subsequent authors.

The name of *Californica*, conferred by Loiseleur Des Longchamps, in 1787 (published in 1816), was accepted by such eminent botanists as London, Endlicher, Hooker and Arnott, Nuttall, Carrère, etc., but was not taken up by most authors of the day, perhaps on account of the error in the description of the seeds, none, no doubt, to mixing of specimens.

However, under the Laws of Botanical Nomenclature adopted at Paris, 1867, and not since repealed, Loiseleur's name for this species must be taken up. Thus reads Art. 49: "An alteration of the constituent characters or the circumscription of a group does not warrant the quotation of another author than the one that first published the name or combination of names." The remark under it reads: "When the alteration is considerable, the words *mutatis characteribus*, or *pro parte*, or *excl. syn.*, *excl. sp. excl. var.* or other abridged indications are added to the quotation of the original author." So the Monterey pine should stand in our literature thus:

PINUS CALIFORNICA, Loiseleur in Nonveau Duhamel, Vol. V., 243 (*excl. charact. seminis*), the character of the seeds only, being incorrectly given.

The treatment of the other species—the Narrow Cone pine—must be more radical, involving the coining of a new name for it:

PINUS ATTENUATA, Lemmon in Herb. This species of pine was described under the name of *Pinus tuberculata*, by Geo. Gordon, in Jour. Hort. Soc. London, IV., 218 and following, (1844) and has generally been adopted by subsequent authors. Mr. Gordon described correctly, and was the first to do so, the Narrow Cone pine, supposing it was the same Don had named, but subsequent examination, as well as Gordon's description, proved that there were two distinct species from nearly the same locality—the vicinity of Monterey bay.

So the name of *tuberculata* for this second species was unavailable, and has been so ever since the distinctness of the species was known.

It seems strange that *tuberculata* being first published for a small-coned form of the Monterey pine (as proved by reference to the figure in Lambert's *Pinus* in the Mercantile library of San Francisco), has been published ever since as a synonym for it without the authors perceiving that, consequently, the name was unavailable for any other species of pine—under the rule of priority.

The name *attenuata* for the Narrow Cone pine which is found sparsely from the Santa Cruz Mts. to the western slopes of the northern Sierra, and beyond in Oregon, is suggested by the long, tapering character of the cones, as well as by the slender habit of the tree when found in groves. J. G. LEMMON.

THE New Mexican coal fields are growing in importance as developments progress. All the five large companies operating at Gallup have consolidated into one corporation under the name of the Crescent Coal Mining Company, with a capital of \$1,250,000, and will probably control all the coal mining of that part of the country. The company owns most of the good lands of the Gallup coal fields.

THE Cerrillos Coal and Railroad Company has been organized in Santa Fe. The charter calls for the building of a railway line, starting at Cerrillos, on the line of the Atchison, Topeka and Santa Fe, and radiating south and west through the coal and mineral fields to San Pedro. This road will open one of the richest coal and mining regions in the west.

THE Union Iron Works of this city have commenced work on a new steamer for the Pacific Mail Steamship Co. She will be 345 feet long, 50 feet beam and be 3550 tons register. The engines are already constructed.

The Most Terrible Volcanic Eruption on Record.

ANTIOCH, CAL., Jan. 4, 1892.

TO THE EDITOR:—Before the year 1883 physical geographers in speaking of the most disastrous volcanic eruption on record, referred first, in point of time, to the celebrated eruption of Vesuvius, in A. D. 79, when the cities of Herculaneum, Pompeii and several smaller towns on the slope of the mountain were destroyed by lava or buried under a mass of pumice stones and ashes; second to that of Hecla and Skaptar Jokull, contiguous mountains in Iceland, in 1783, when two enormous lava streams, one fifteen miles wide and over 100 feet deep and the other scarcely inferior, flowed, the first, fifty miles and the other forty, till they reached the sea, pouring a flood of white hot lava into the ocean, destroying everything in their paths and killing in the waters of the ocean the fish, the mastodons of the inhabitants, who were reduced by the disaster, directly or indirectly, to less than five-sixths of their former strength, and third to that of Galunggung, in 1822, which devastated such an immense area in Java, but all the eruptions known besides were as mere child's play to the terrible one of Krakatoa in 1883.

If the reader will examine the map of the East Indies he will find represented in the straits of Sunda, which lie between Sumatra and Java, the little island of Krakatoa. In maps made before 1883 he will find in vain for the name, for like Bull Run before 1861 it was then unknown to fame, though navigators who passed through the straits knew it as a beautiful tropical isle, with an extinct volcanic cone in the centre. In the beginning of 1883, however, the little well-behaved island showed symptoms of wrath that boded no good to the larger islands in the vicinity. Noted for the fine froths with which it abounded, it was a famous picnic ground for towns and cities even a hundred miles away, and when the subterranean rumblings and mutterings of wrath became ominous to the people of the capital of Java, Batavia, put a steamboat into requisition and visited the island in large numbers. For a time the island was constantly in a slight tremor, and the subterranean roar was like the continued, but distant mutterings of thunder, but the crisis was reached August 23rd, at 10 o'clock, A. M. It was a beautiful Sunday morning and the waters of the straits of Sunda were like that sea of glass, as clear as crystal, of which John in his apocalyptic vision speaks. The beauty that morning was enhanced by the extraordinary transparency of the tropical air, for distant mountain ranges seemed so near that it seemed possible to strike them with a stone cast from the hand. Only the mysterious rumblings and mutterings of the pent up forces beneath the island, disturbed the breathless calm and silence that lay on nature—the calm before the terrible storm—the mightiest, the most awful on record! It burst forth! Suddenly night snatched away day from the eyes of the terrified beholders on the mainland, but the vivid play of lightnings around the ascending column of dust penetrated even the deep obscurity to a distance of eighty miles. This awful darkness stretched within a circle whose diameter was 400 miles, while more or less darkness reigned within a circle with a diameter three times as great. Within this latter area dust fell like snow from the sky, breaking off limbs of trees by its weight miles distant, while in Batavia, 100 miles away from the scene of the disaster, it fell to the depth of several inches. The explosions were so loud as to be distinctly heard in Hindostan, 1800 miles away, and at Batavia, the sound was like the constant roar of cannon in a field of battle. Finally the whole island was blown to pieces and now came the most awful contest of nature—a battle of death between Neptune and Vulcan—the sea poured down into the chasm millions of tons only to be at first converted into vapor by the millions of tons of seething white-hot lava beneath. Over the shores thirty miles away, waves over one hundred feet high rolled with such a fury that everything, even to a part of the bedrock, was swept away. Blocks of stone of 50 tons weight were carried two miles inland. On the Sumatra side of the straits a large vessel was carried three miles inland. The wave, of course growing less in intensity, traveled across the whole Indian Ocean, 5000 miles, to the Cape of Good Hope and around it into the Atlantic. The waves in the atmosphere traveled around the globe three times at the rate of 700 miles per hour. The dust from the volcano was carried up into the atmosphere fully twenty miles and the finest of it was distributed through the whole body of air. The reader doubtless remembers the beautiful reddish or purple glow at sunrise and sunset for fully six months after August 1883—that glow was caused by volcanic dust in the atmosphere interfering with the passage of the sun's rays of the upper part of the solar spectrum, more manifest at sun-rising and settling than at other times during the day, because at these periods the sun's rays have to travel obliquely through the atmosphere and consequently penetrating a very deep layer, were deprived of all their colors except the red.

The loss of life was appalling. The last sight on earth to 35,000 people was that of the awful eruption. Engulfed in the ocean or covered with heaps of ashes, a few hours after the eruption commenced the awful work was done, and that vast multitude had vanished from off the face

of the earth. The fact that in the neighborhood of the mountain there was a sparse population accounts for there not being even a far greater loss of life.

Notwithstanding the awfulness of volcanic and earthquake phenomena, there is some alluring lining to the dark clouds. They prove that the earth is yet a living planet. Centuries must pass away before it will become like the moon—a dead planet—without water, air or life. Our satellite is a prophecy indeed of what the earth must eventually become when all its life forces, its internal energies, are dissipated into space.

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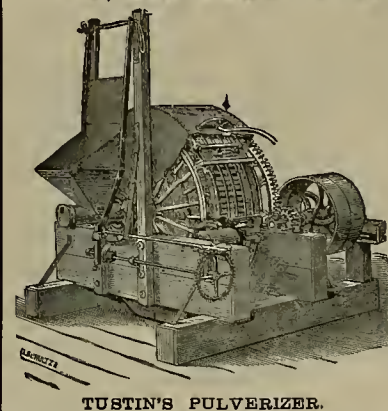
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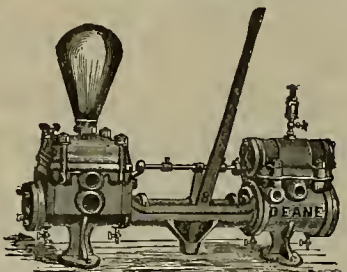
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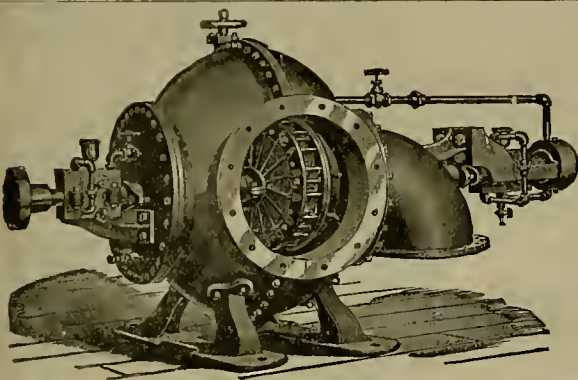
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Jan. 14, 1892.

The past week shows a slight increase in general trade. Quite a thorough canvass among iron workers and business men in general, develops the fact that a more cheerful and confident feeling seldom, if ever before, prevailed than is now prevalent. The feeling is grounded on confirmed advices of a largely increased acreage seeded to grain, active railroad building and other internal improvements, an almost certainty of a resumption of hydraulic mining, more attention to deep mining, an easy money market, and last, but by no means the least, seasonable rains for agricultural purposes and heavy deposits of snow on the mountain ranges. Of necessity the situation at the East is also taken into consideration, which never before was so promising.

This is witnessed in the latest returns of the estimates by States of the area, product and value of principal cereals in the United States for 1891 have been made by the Department of Agriculture. It is given out that the crops of corn, wheat and oats, including all but two or three per cent of the cereal aggregate, have been reported. The aggregates are as follows: Corn area 76,205,000 acres, product 2,000,154,000 bushels, value \$836,436,000. Wheat area, 30,917,000 acres; product 611,780,000 bushels; value, \$593,473,000. Oats, area, 25,582,000 acres; product, 736,394,000 bushels; value, \$232,312,000. The aggregate of all cereals is the largest yet produced, and will supply from 54 to 55 bushels per unit of population. The wheat supply is the largest ever reported in proportion to the population. It will average 9.4 bushels to each person, against 9.2 for the largest previous crop in 1884. The average value to the farmer is 40.6 cents for corn, 83.93 cents for wheat, and 31.46 cents for oats.

The above gives the largest money values to farmers ever before recorded, and as they are the bone and sinew of general prosperity, it seems as if the ground work could not possibly be better. The large crops will net to the railroads largely increased gain in earnings, which will bring into life more active times in all branches of trade directly or indirectly dependent on them.

QUICKSILVER—Receipts the past week aggregate 239 flasks. The market is steady at \$47, with a reported light call ruling.

MEXICAN DOLLARS—The market is irregularly weak at around 74 cts. The gradual decline in silver causes Chinamen and other exporters to China to confine their purchases as much as possible.

SILVER—The local, Eastern and foreign markets have settled to lower figures. The decline is evidently due more to manipulation through press news and in other ways, than to any unfavorable change in the situation. Our advices from the East are confirmatory that Congress will act favorably on a free coinage bill, but confining it to the output of the mines in this country. The bill will probably allow depositors of bullion, either gold or silver, the option of taking coin, or else treasury notes redeemable in coin. The bill may also provide for free and unlimited free-coinage, provided certain favorable steps are taken by leading European Governments. Our advices are also confirmatory of a strong probability that a bill will pass calling an international monetary congress. All now points to something being done at this session so as to keep the silver question from being a factor in the Presidential election this year.

BORAX—Receipts aggregate 424 cts. The market is steady, with fairly free shipments being made Eastward.

LIME—Receipts are light; they only aggregate 2341 bbls. the past week. The Hawaiian Islands are drawing more from us.

LEAD—The market is steady. The East reports the market essentially unchanged.

IRON—Imports the past week aggregate 50 tons from New York. The local market is strong, with a large consumption. English advices report a stronger market, due to lessened stocks in the face of lighter exports. Eastern advices, while indicating a seeming movement toward more steadiness, report irregular quotations.

TIN—Imports the past week aggregate 280 pigs from San Diego, and 5500 boxes of plate from Liverpool. The market begins to show signs of more business in plate soon. New York reports an irregularly dull market. London cables to the *Iron Age*, January 7th, are: "There has been more inquiry for tin plate, chiefly from San Francisco, without much actual business resulting. Terns and lower-grade charcoals are in rather better request."

COPPER—The market is firm but quiet. The prevailing opinion appears to be that the market struck bottom in last November. New York mail advices note continued sales at strengthening prices. Holders appear to exhibit more faith in the market. Lake was quoted at 11c to 11 1/2c and casting brands at 10 1/2c to 10 3/4c. London cables to the *Iron Age* report as follows:

In price of merchant bar copper there has been a rise to £47 7s 6d for prompt delivery, followed by reaction of about 15s. The stronger tone and advance in price were due partly to speculative buying, some of which is said to have been for account of a French clique, but good consumptive demand helped the market. The decline during the last few days was due to somewhat heavy realizations by speculative holders. Sales of furnace material during the past fortnight include 200 tons Montana matte at 9 shillings per unit. Visible supply decreased 29 tons, and spot stocks 549 tons last month.

COAL—Imports the past week aggregate as follows: Glasgow, 4876 tons; Liverpool, 10,567; sharpness, 1000; Cardiff, 2435; New York, 250; Greenock, 2600; Newcastle, N. S. W., 5548; Nanaimo, 2302; Tacoma, 2250; Seattle, 6190; Swansea, 2722; Departure Bay, 5712; Comox, 4100; total, 59,541. Notwithstanding heavy arrivals and the scarcity of yard room, the spot market holds up well. Cold weather has stimulated the consumption of house coal, while steam coal shows no falling off in consumption. It now looks as if we will have cheap coals throughout 1892. This opinion, of course, is based on a large acreage seeded to wheat and uniform favorable reports received from the stands. All now depends on the spring rains.

Mining Share Market.

Comstock mining shares the past week were more active under the leadership of Belcher. The liveliest movements were in the Gold Hill shares, although the Middles scored a slight advance, but the up move in the latter was only a flash in the pan. The activity in Belcher's shares is claimed to be on an improvement in the mine on the 1300-foot level. Seeing that the MINING AND SCIENTIFIC PRESS as far back as February, 1889, reported a connection on that level between the Belcher south drift and the Seg. Belcher north drift, so as to show up the rich ore known to exist to the west; the new (?) find is rather stale. But then it is better to report it late than never, even if it is a forced proceeding, due to a contest for control of the mine. Perhaps the management is playing the virtuous act to win, if possible, the confidence of shareholders, so as to carry the annual election of officers, and if successful, then continue through some kind of hocus-pocus assessments for the public and spoils for the rings. The management in showing up the west lode and starting up the mill on paying ore looks very much like a practical illustration of the old saying that when the evil one got sick he forewore his evil ways, but when he got well he returned to them with renewed vigor. The general feeling is that the present management will retain control of the mine, and after election sell off their holdings and levy an assessment. While this is the general impression yet there are a limited few who have confidence in the stability of the movement. Time will only tell which is correct. The mine, if properly managed, ought to be paying dividends.

Outside mining shares, the past week, were flat, stale and unprofitable, with transactions outside of the Bodie few and far between. Toward the close, the Quifoots were stronger. The "Razor Blade" or Tuscarora pool appears to be playing a waiting game, that is, make their stocks active when the Comstocks come more to the front.

Is there an annex to the mill that is reducing Con. Virginia ore? If there is not, then why are car sample assays not given by the superintendent in his weekly letters. John W. Mackay, while testifying in M. W. Fox's suit against the Hale and Norcross directors, said that car sample or mine assays are a check against mill owners, for it prevents them from getting away with bullion that rightfully belongs to shareholders in the mines. In the above suit it was proven that through the annex fully one-half of the assay value of the ore went to others than outside shareholders in the mine. If the directors of mines wish to be above even the suspicion of being dishonest, they should insist on their superintendents giving car sample assays, and also conforming to all else required by the mining laws of this State under which they are incorporated. Obey the laws is all that is required, and any fight in court or otherwise to evade them does not look as if the mine is being managed honestly.

About a year ago M. W. Fox, as owner of 19 1/2 feet of the Savage Mining Co.'s ground, brought suit against the directors for an accounting, and also alleged that there was overcharge for milling, besides general mismanagement. Judge Sanderson, before whom the suit was brought, has decided against Fox and stated that he had other means of securing his rights, as the suit should have been brought in Nevada. It is to be hoped that the case will be appealed, so as to settle forever several disputed points.

The Supreme Court of this State, in the suit of Manuel Eyre against the directors of several of the mining companies, upheld Judge Hunt's decision that in making the monthly statements a balance sheet or general statement conformed to the laws, but said that the judge erred in striking out that part of the complaint requiring full detailed reports weekly by the superintendents of the mines, and therefore referred the case back for a new trial. Rather than stand a new trial, it is said that the defendants settled with the plaintiff. This is proof positive of the correctness of the PRESS in its contention that superintendents do not obey the law, and in not doing so the directors are personally responsible. Give the mine or car sample assays.

At the third annual election of the Mining Stock Association on Wednesday, Dr. W. N. Griswold was reelected Pres. and John H. Tingman Sec'y. Mr. Tingman was elected Treasurer in place of Coll Deane, deceased. The old Executive Committee, with M. W. Fox chairman, was reelected. Mining shares opened this (Thursday) morning firm but inactive. The points out are for lower prices. The only stocks that appear to show any life are the six that the combination of brokers in the S. F. Stock Board Exchange are forcing the managers to buy so as to retain control. This morning Sierra Nevada showed more life.

A. G. Gurnett says that the brokers' combination, organized to force mine managers to buy their stock so as to control the mines, is meeting with unqualified success. They are now at work on Sierra Nevada, owing to its annual election coming first.

News from the Comstock mines continues to improve. What is allowed to leak out inevitably due to fears entertained by the rings of the combinations against them. In looking over back reports of official letters from the Belcher, we find that in December, 1890, a west crosscut was started from the 1400-foot level, and that in February of 1891 an upraise was commenced from the end of the crosscut to connect with the 1300-foot level. The raise was carried up to connection all the way in ore. Our advices from the mine, report that they followed a small streak of rich ore from the Seg. Belcher line northward and then started to raise on it, and that the ore has widened to six feet. It now looks as if they may show up the ore body to the west, but there have been so many deceptions in the past that very few have confidence in the present work being carried out for the interest of outsiders. In the other Gold Hill mines, important work is still being pushed, with much of it of secret character. The news from the middle mines grows more important as active developing work is pushed. The same remarks apply to the north end mines. The Alta mill has shut down, and pumping is resumed, possibly to freeze out shareholders.

From the outside mines our advices report that Peer ore milled, went over \$28 per ton battery assay. A bullion shipment is on the way. In Peerless, they are getting into the downward continuation of ore found above. Bulwer's ore the past week milled over \$41 per ton. In Bodie they are following small

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ASSESSMENTS.				
COMPANY AND LOCATION.	NO.	AMT.	LEVISED, DELINQ'T AND SALE.	SECRETARY.
Alta S M Co, Nevada.....	41.....	50c.....	Jan 5, Feb 9, Feb 23.....	L Osborn, 309 Montgomery
Butte Queen M Co, California.....	1.....	2c.....	Nov 27, Jan 5, Jan 25.....	V T Gadesden, 119 Bush
Chollar M Co, Nevada.....	32.....	50c.....	Jan 8, Feb 11, March 3.....	C E Elliott, 309 Montgomery
Con St Godard M Co, California.....	4.....	5c.....	Dec 21, Feb 23.....	T Wetzel, 320 Sansome
Crocker M Co, Arizona.....	11.....	10c.....	Dec 15, Jan 19, Feb 11.....	Nat T Messer, 309 Montgomery
Crown Point M Co, Nevada.....	55.....	50c.....	Dec 2, Jan 6, Jan 27.....	J Newlands, 331 Pine
Gould & Curry M Co, Nevada.....	65.....	30c.....	Jan 4, Feb 8, March 1.....	A K Durbrow, 309 Montgomery
Gold Mountain M Co, California.....	1.....	50c.....	Jan 4, Feb 8, Feb 27.....	C E Durdie, 215 Grant Ave
Grass Valley Gold M Co, California.....	3.....	25c.....	Dec 8, Jan 14, Jan 30.....	J F Holting, 110 Phelps Building
Gray Eagle M Co, California.....	1.....	2c.....	Jan 11, Feb 15, March 7.....	A W Barrows, 303 California
Hale & Norcross S M Co, Nevada.....	100.....	50c.....	Dec 21, Jan 26, Feb 17.....	A B Thompson, 309 Montgomery
Morgan M Co, California.....	15.....	10c.....	Nov 20, Dec 23, Jan 20.....	L O Brees, 320 Montgomery
Occidental Con M Co, Nevada.....	9.....	25c.....	Dec 13, Feb 16, March 10.....	A K Durbrow, 309 Montgomery
Potosi M Co, Nevada.....	3.....	50c.....	Dec 10, Jan 13, Feb 4.....	C E Elliott, 309 Montgomery
San Francisco M & M Co, California.....	1.....	2c.....	Jan 12, Feb 16, March 8.....	Obas H Osborn, 309 Montgomery
Scorpion S M Co, Nevada.....	27.....	50c.....	Dec 15, Jan 22, Feb 15.....	Geo R Spinner, 310 Pine
Siskiyou Con Quicksilver M Co, California.....	2.....	2c.....	Dec 2, Jan 2, Feb 19.....	E F Stone, 315 Pine
Teresa M Co, Mexico.....	8.....	10c.....	Dec 1, Jan 4, Jan 22.....	A Cheminant, 328 Montgomery
Terikoff M & M Co, California.....	7.....	1c.....	Jan 2, Feb 2, Feb 23.....	W J Gurnett, 338 Pine
Justice M Co, Nevada.....	43.....	25c.....	Dec 23, Jan 28, Feb 17.....	R E Kelly, 419 California
Umpire G & S M Co, Oregon.....	4.....	10c.....	Dec 16, Jan 25, Feb 15.....	A Cheminant, 328 Montgomery
Union Con S M Co, Nevada.....	45.....	25c.....	Jan 6, Feb 11, March 2.....	A W Barrows, 303 California

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	MEETING.	SECRETARY.	DATE.
Belcher S M Co, Nevada.....	Annual.....	A L Perkins, 331 Pine.....	Jan 26
Crocker M Co, Arizona.....	Annual.....	Aug Waterman, 309 Montgomery.....	Jan 18
Mexican G & M Co, Nevada.....	Annual.....	A T Corbus, 424 Montgomery.....	Jan 28
North Commonwealth M Co, Nevada.....	Annual.....	J W Frew, 310 Pine.....	Jan 26
Sierra Nevada S M Co, Nevada.....	Annual.....	E L Parker, 309 Montgomery.....	Jan 20
Utah Con M Co, Nevada.....	Annual.....	A H Fisher, 309 Montgomery.....	Jan 27

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Champion M Co.....	T W Ford, 320 Sansome.....	Aug 15
Con St & Virginia M Co, Nevada.....	A W Barrows, 303 California.....	Aug 17
Crocker M Co.....	E M Hall, 311 Montgomery.....	Sept 10
Eureka Con M Co, Nevada.....	H P Bush, 101 Sansome.....	Jan 5
Great Western Quicksilver M Co.....	A Halsey, 328 Montgomery.....	Oct 1
Isham M Co, Nevada.....	Geo V. Burt, 309 Montgomery.....	Aug 4
Mayflower Gravel M Co, California.....	D M Kent, 330 Pine.....	Aug 30
Pacific Coast Borax Co, California.....	A H Clough, 323 Montgomery.....	Jan 11
Standard Cons M Co, California.....	J W Pew, 310 Pine.....	Dec 22

seams of rich ore. The Tuscarora mines' reports are of the usual rosate character.

At the annual election of Bullion held to-day, a number of brokers gave their proxies for voting purposes.

San Francisco Metal and Coal Market.

THURSDAY, January 14, 1892.	
ANTIMONY.	STEEL.
Per lb.....	English, lb.....
Refined, in car lots.....	8 1/2 @ 20
Powdered, do.....	8 @ 9
Concentrated, do.....	8 @ 9
All grades jobbing at advance.	Toe Calk.....
	4 1/2 @ 5
COPPER.	TIN PLATE.
Bolt.....	B. V. steel grade.....
Sheathing.....	14x20, spot.....
Ingot, jobbing.....	14x20, 14x20, 6 00 @ 6 50
Do, wholesale.....	Do roofing, 14x20 6 00 @ 6 50
Fire Box Sheet.....	Do, 20x28.....
	12 00 @ 13 00
IRON.	Pig iron, spot.....
Bar, base.....	Irreg. spot.....
Norway, base.....	1 @ 21
PIG IRON.	COAL.
Spot, from yard—PER TON.	
Eglinton.....	Wellington.....
Glenbrook.....	Gretta.....
Ann. Soft, No. 1.....	Nanaimo.....
Oregon Pig.....	Seattle.....
Puget Sound.....	Seattle.....
Clay Lane White.....	Cool Bay.....
Shotts, No. 1.....	Channell.....
Langdon.....	Egg hard.....
Tonoloway.....	Cumberland, in sacks.....
Gairbairrie.....	Do, bulk.....
Barrow.....	Wallased.....
Carleton.....	Scott's Split.....
By the Bulk.....	Scott's Split.....
Per ton.....	West Hartley.....
LEAD.	TO LEAD—PER TON.
Pig.....	Australian.....
Bar.....	Liverpool 36 am.....
Sheet.....	Scott's Split.....
Pipe.....	Cardiff.....
SHOT.	LEIGH LUMP.....
(Discount 10c on 50 bag.)	Cumberland.....
Drop, 3 bag.....	Egg hard.....
Egg, 3 bag.....	West Hartley.....
Chilled, do.....	5 50 @ 9 00
QUICKSILVER.	GOKE.
By the bulk.....	Do, spot, in bulk.....
Flasks, old.....	10c, in sacks.....

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

ALCYONE G. AND S. M. Co., Jan. 8. Capital stock, \$10,000,000. Directors—W. A. Keeper, John C. Quinn, Edward Lander, William B. Murdoch, John T. Evans, Eugene N. Deuprey and J. D. Whitney.

AMERICAN CAP CO., Jan. 8. Object, to manufacture detonating powder and caps. Capital stock, \$250,000. Directors—Geo. P. Thurston, Wm. P. Morgan, Samuel Rodgers, Wm. J. Casey and James P. Pierce.

ALASKA PACKING CO., Jan. 13. Capital stock, \$4,000,000. Directors—E. B. Pond, Chas. Hirsch, Sidney M. Smith, H. F. Fortmann, G. W. Hume, E. B. Beck, S. B. Peterson.

PACIFIC COAST ALUMINUM CO., Jan. 13. Capital stock, \$1,000,000. Directors—A. G. Sneath, F. A. Rich, Thos. Archer, Wm. Tappenbach and H. Thompson.

HOPPER ALUMINUM CO., Jan. 13. Capital stock, \$1,000,000. Directors—Andrew J. Hopper, Valentine I. Gadesden, Paul R. Jarboe, Wilberforce R. Moned, John R. Jarboe.

WHITE HORSE VALLEY MILL & LUMBER CO., Jan. 13. Capital stock, \$500,000. Directors—Charles Slasky, Henricus Graf, Wolrad Winterberg, Louis Cooks, Edmund Godchaux, N. Steiner, John Curran.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. C. HOAG—San Francisco.
R. G. BAILEY—San Francisco.
GEO. WILSON—Sacramento Co.
J. H. CROSSMAN—Perris, Cal.
CHAUNCEY A. DUTTON—San Lucas, Cal.
G. R. GILL—Cambridge, Cal.
A. DONALD—Hollister, Cal.
J. T. AUSTIN—Tulare County.
WM. T. HALL—Cloverdale, Cal.
SAMUEL B. CLIFF—Oreston, Cal.
S. A. DOWLER—Santa Clara Co.
W. W. MASON—Nevada.

FOR SALE—A GOLD MINE (QUARTZ), WELL DEVELOPED; for particulars, address G. W. MUNKOE, Glennco, Calaveras County, Cal.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 24.	WEEK ENDING Dec. 31.	WEEK ENDING Jan. 7.	WEEK ENDING Jan. 14.
Alba.....	40.....	50.....	45.....	50.....
Alta.....	70.....	75.....	70.....	80.....
Andes.....	55.....	70.....	65.....	55.....
Bell.....	1.20.....	1.55.....	1.30.....	1.50.....
Belle Isle.....	.....	.....	.....	.....
Best & Belcher.....	1.95.....	2.25.....	2.00.....	2.15.....
Bullion.....	1.05.....	1.55.....	1.15.....	1.25.....
Butte.....	55.....	70.....	65.....	55.....
Bulwer.....	50.....	55.....	45.....	50.....
Commonwealth.....	.....	.....	.....	.....
Con. Va. & Cal.....	3.85.....	4.30.....	4.10.....	4.05.....
Challenge.....	55.....	60.....	55.....	75.....
Chollar.....	1.35.....	1.35.....	1.35.....	1.35.....
Confidence.....	2.10.....	2.75.....	2.90.....	2.75.....
Con. Imperial.....	.....	.....	.....	.....
Caladenia.....	30.....	50.....	30.....	30.....
Crocker Point.....	.....	.....	.....	.....
Crocker.....	.....	.....	.....	.....
De Monte.....	50.....	15.....	55.....	50.....
Eureka Con.....	.....	2.30.....	.....	.....
Exchequer.....	35.....	55.....	40.....	40.....
Grand Pri.....	.....	.....	.....	.....
Gould & Curry.....	95.....	115.....	100.....	115.....
Hale & Norcross.....	90.....	135.....	103.....	100.....
Julia.....	10.....	10.....	10.....	10.....
Judith.....	.....	.....	.....	.....
Kent.....	20.....	25.....	20.....	25.....
Lady Wash.....	15.....	15.....	15.....	15.....
Mono.....	50.....	55.....	60.....	55.....
Mexican.....	1.50.....	1.85.....	1.60.....	1.50.....
North Belle Isle.....	.....	.....	.....	.....
Neve.....	.....	.....	.....	.....
Occidental.....	40.....	50.....	40.....	45.....
Opbir.....	2.55.....	2.95.....	2.80.....	2.75.....
Overman.....	1.10.....	1.10.....	1.10.....	1.10.....
Potosi.....	1.20.....	1.70.....	1.25.....	1.35.....
Peerless.....	15.....	20.....	15.....	15.....
Peer.....	25.....	30.....	25.....	30.....
Savage.....	1.30.....	1.50.....	1.30.....	1.40.....
S. B. & W.....	40.....	50.....	40.....	50.....
Sierra Nevada.....	1.55.....	1.80.....	1.65.....	1.70.....
Silver Hill.....	10.....	15.....	10.....	15.....
Scorpion.....	10.....	15.....	10.....	15.....
Union Con.....	1.35.....	1.55.....	1.10.....	1.30.....
Utah.....	35.....	50.....	35.....	45.....
Yellow Jacket.....	80.....	110.....	85.....	95.....

* Assessment added.

Sales at San Francisco Stock Exchange.

THURSDAY, January 14, 9:30 A. M.	
800 Belcher.....	2.05 @ 2.10
800 Chollar Con.....	450 @ 1.10 @ 1.15
100 Chollar Con.....	30 Hale & Norcross.....
100 Con Cal & Va.....	100 Seg Belcher.....
400 Con New York.....	500 Sierra Nevada.....
3200 Crocker.....	50 Union Con.....
1000 Exchequer.....	300 Yellow Jacket.....

Eastern Metal Markets.

By Telegraph.

New York, January 13.—The following are the closing prices the past week:

Silver in Silver	Copper.	Lead.	Tin.
Thursday.....	94 1/2	10 7/8	4 25
Friday.....	94 1/2	10 7/8	4 25
Saturday.....	94 1/2	11 00	4 25
Monday.....	94 1/2	11 1/2	4 30
Tuesday.....	94 1/2	11 1/2	4 30
Wednesday.....	94 1/2	11 00	4 30

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

- FOR WEEK ENDING JANUARY 5, 1892.
- 466,319.—GLOVE FASTENER—Wm. H. Bell, S. F.
- 466,453.—FRUIT-CUTTING MACHINE—John Burns, Los Angeles, Cal.
- 466,521.—PIPE COUPLING—Wm. L. Fitts, San Jose, Cal.
- 466,674.—WEED PULLER—Gatgens & Dowdin, Central House, Cal.
- 466,675.—VEHICLE SPRING BRACE—S. J. Graham, Colville, Wash.
- 466,538.—VEHICLE SPRING—J. Heilrath, Plymouth, Cal.
- 466,526.—GRAIN AGITATOR FOR SEPARATOR SHOES—C. A. Kelley, Ripon, Cal.
- 466,716.—THRILL-COUPLING—L. C. Rasmussen, S. F.
- 466,378.—IRONING TABLE—G. N. Simmons, Santa Cruz, Cal.
- 466,471.—CONDUIT FOR ELECTRIC RAILWAYS, C. P. Tatrow, Spokane, Wash.
- 466,731.—POWER MECHANISM—G. O. Vernon, Albany, Or.
- 21,286.—DESIGN FOR WATER-WHEEL CASING, A. P. Brayton Jr., S. F.

The following brief list by telegraph, for Jan. 12, will appear more complete on receipt of mail advices:

Charles Buckner, San Francisco, zipper; James J. Culley, San Francisco, cuff holder; Robert H. Dixon, Santa Rosa, pruning implement; C. F. Gillett, Corvallis, Oregon, potato planter; Samuel N. Goldy, San Francisco, wash balance; Andrew S. Halldie, San Francisco, clip for rope tramways; Emory I. Nichols, San Francisco, pulverizing mill; F. H. Elephar and A. Renard, Chehalis, Wash., stump extractor; John R. Russell, San Francisco, ore feeder; Augustus E. Scharf, Tacoma, Wash., brake for children's carriage.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GRAIN AGITATOR FOR SEPARATOR SHOES.—Chas. A. Kelley, Ripon, San Joaquin Co. No. 466,526. Jan. 5, 1892. This invention applies to separators, including the ordinary thrashing machines and the combined harvesters. It consists in combination or connection, with the shoe of the separator, of a revolving agitator above said shoe, the object of which is to lift and stir up the material upon the surface of the sieve, thereby affording the wind a better opportunity of blowing away the chaff

and straw, and allowing the grain to pass through the sieves or riddles. The object of the particular construction of the agitator is to keep the material from packing or bunching on the sides of the shoe, and to agitate and throw it upwardly to the center, where another portion of the agitator acts upon it to keep it in motion, and allow the wind to more effectually separate the chaff and straw.

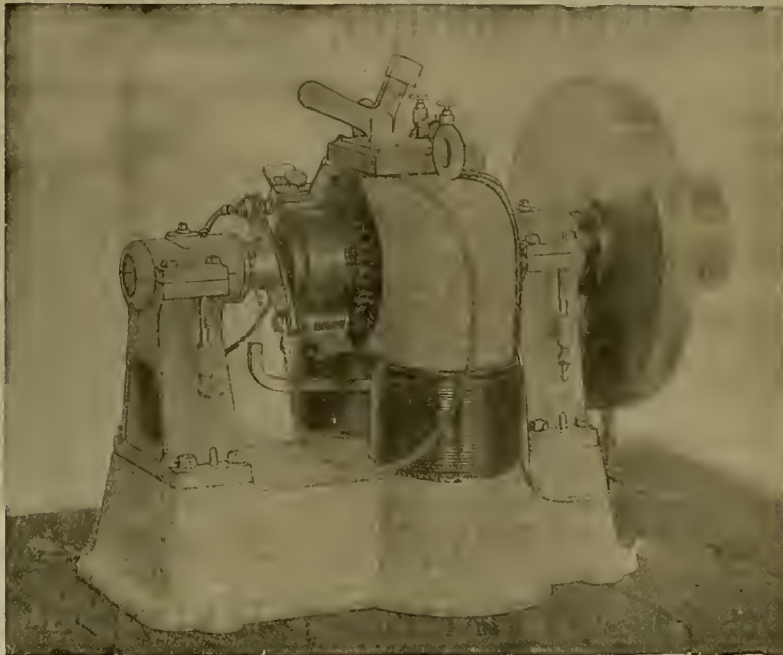
PIPE-COUPLING.—Wm. L. Fitts, San Jose. No. 466,521. Dated Jan. 5, 1892. This improved means of coupling pipes together consists of two collars into which the outwardly turned and parallel flanges of the adjacent ends of the pipes to be coupled are fitted, guides by which these collars are brought together with a certain relation to each other, and a lever mechanism fulcrumed to one of the collars and acting against the other, whereby the two parts are drawn and locked together. It also consists in a means for regulating the tension or pressure by which the parts are held together.

CAR-COUPLING.—John C. Look, San Jose, No. 465,987. Dated Dec. 29, 1891: This is one of that class of car-couplings in which the drawbars have hooked heads, with the hooked surface vertical to the plane of the car, and acted on laterally by springs which press the hooks in together, it being of that type known as the "Miller coupling." But the most novel construction consists in having a yielding guard-bar opposite the hook; the guard-bar is pivoted to the car underneath, and extends out in the same direction as the drawbar, and is pressed inwardly toward the hook by a spring. The drawbar and guard-bar are held apart by a brace, which may be fastened to either of them, and leaves just enough space for the opposite hook-head. The springs are so arranged in connection with a stop that the hook is held in the middle of the car when uncoupled. The drawbar has a pivoted-hooked head, with a locking lever held by a spring-pressed pawl in the drawbar, and a chain and bar extending to the side of the car to unlock the pawl, a buffer arm extends out on the hook side of the drawbar to meet the opposite coupling head. A platform buffer constructed in a novel manner, is also connected with the coupling. The coupling is automatic in all positions in which it may be left, both as a coupler and buffer.

RUPTURE. PILES and all Rectal Diseases POSITIVELY CURED, in from 30 to 60 days, WITHOUT OPERATION OR DETENTION FROM BUSINESS. ALSO ALL NERVOUS, SKIN, BLOOD, PRIVATE AND CHRONIC DISEASES OF BOTH SEXES. STRICTURE AND URINARY TROUBLES CURED. No charge unless cure is effected. Consultation free. Call or address for pamphlet. DR. PORTERFIELD & LOSEY, 833 Market St., San Francisco, Cal.

MINING AND SCIENTIFIC PRESS. The Leading Mining Journal in America. Established 1860. Latest Discoveries in Science and Improvements in Mining and Mechanic Arts Illustrated or Described. A Standard Illustrated Weekly published at \$3 a year by DEWEY & CO., 220 Market St., San Francisco, Cal.

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— MANUFACTURER OF —
Dynamos and Electric Motors
FOR THE TRANSMISSION AND DISTRIBUTION OF POWER



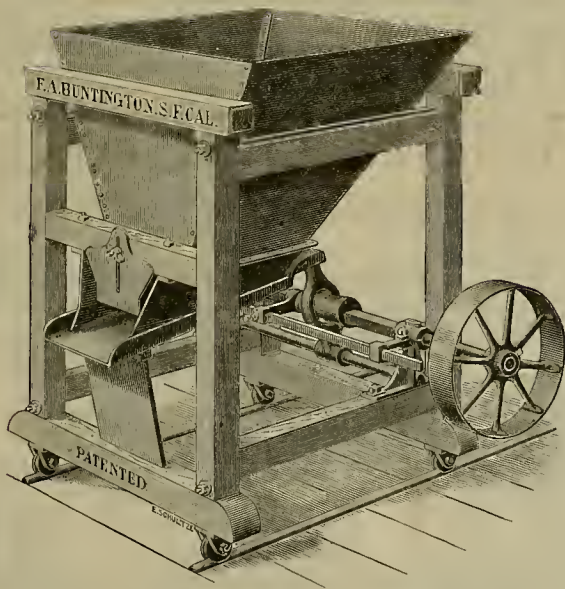
Manufacturer of and Contractor for the Installation of all Kinds of
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The Dynamos and Motors manufactured by this Company develop the highest mechanical efficiency; they require little or no attention, are almost noiseless, and run with an entire absence of sparks at the brushes, rendering the daily trimming of brushes unnecessary.

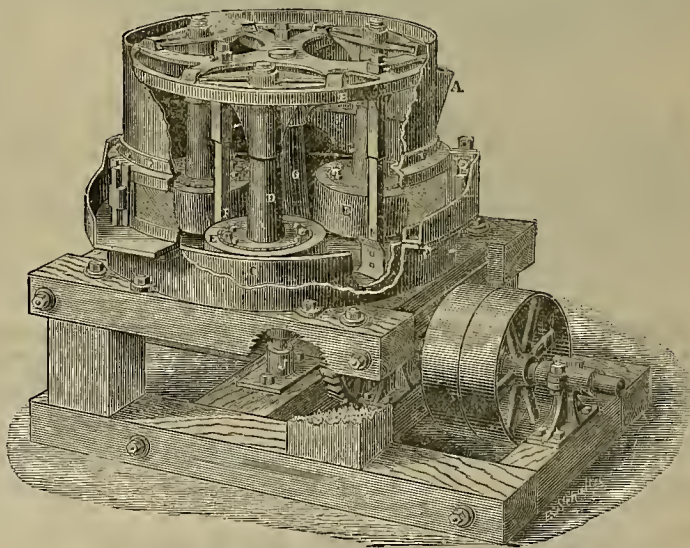
Electric Power Apparatus for Quartz Mills, Hoisting, Pumping, Drilling, and all Mining Work, where Long Distance Transmission is desired, a Specialty.

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PATENT ORE FEEDER. CENTRIFUGAL ROLLER QUARTZ MILL.



This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

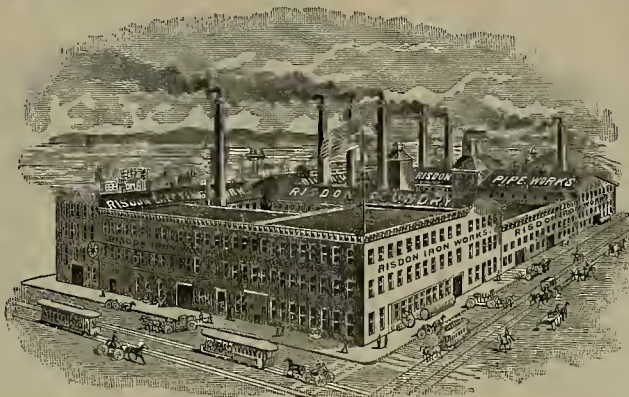
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Portable Hoisting Engines,
Hydraulic Hoisting Machinery,
Water Power Hoists,
Direct Acting Pumping Engines,
Geared Pumping Engines,
Hydraulic Pumping Machinery,
Steam Mining Pumps,
Plunger and Bucket Mining Pumps,
Working and Balance Pump Bobs,
Air-Compressing Machinery,
Rock-Drilling Machinery,
Ventilating Machinery,
Tramway Machinery,
Rope Transmission,
Steel Whlms and Attachments,
High Pressure, Condensing, Compound,
Triple and Quadruple Expansion
Stationary Engines,
Corliss Engines.



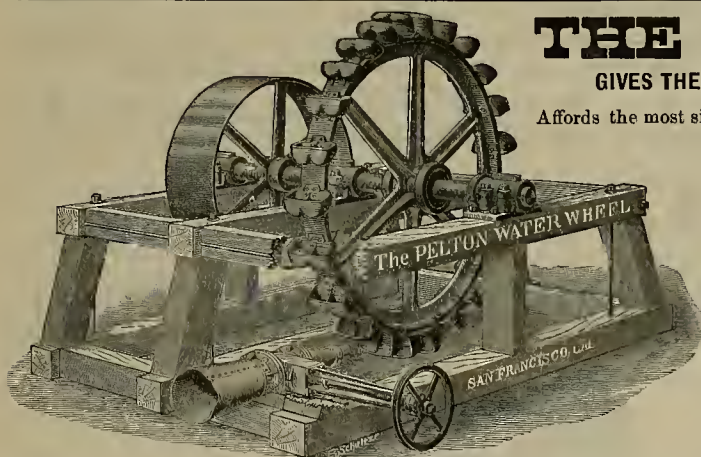
Heine Sectional Safety Boilers,
Tubular, Firebox and Flue Boilers,
Gold Stamp Mills,
Silver stamp Mills,
Bryan Roller Quartz Mills,
Concentrating Mills,
Chlorination Works,
Ore-Sampling Machinery,
Water-Jacket Smelting Furnaces,
Roasting Furnaces,
Copper-Smelting Works,
Lead-Silver Smelting Works,
Tulloch Concentrators,
Sugar Machinery,
Cable Road Machinery,
Electric Railway Power Machinery,
Iron Poles for Electric Railways.
HYDRAULIC RIVETED WATER-PIPE,
SHEET STEEL AND IRON PIPE,
Mill & Mining Appliances of every description.
Davidson Steam Pumps,
Marsh Steam Pumps.

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High Pressure, Condensing, Compound, Triple and Quadruple Expansion Marine Engines. Marine Boilers of every type.
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GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD. OVER 2000 IN ACTUAL USE.

Affords the most simple and reliable power for all mining and manufacturing machinery. Adapted to heads running from 20 up to 2000 or more feet. From 20 to 30 per cent better results guaranteed than can be produced from any other wheel in the country.

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The advantages the Pelton Wheel affords in the way of a uniform and reliable power, close regulation, and the facility of adaptation to varying conditions of speed and pressure, have brought it into special prominence and extensive use for this class of work.

All applications should state amount and head of water, power required and for what purpose, with approximate length of pipe line. SEND FOR CATALOGUE.

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For prospecting Mineral Veins and Deposits, Boring Vertically, Horizontally, or at any angle to any desired depth, taking out a Cylindrical Section or Core the entire distance, showing exact character, and giving a perfect section of the strata penetrated. Also for Boring Artesian Wells perfectly straight, round and true.

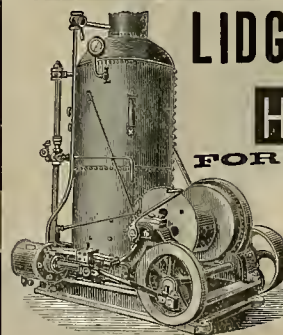
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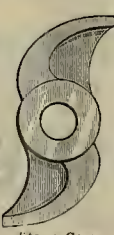
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HAVEN & HAVEN,
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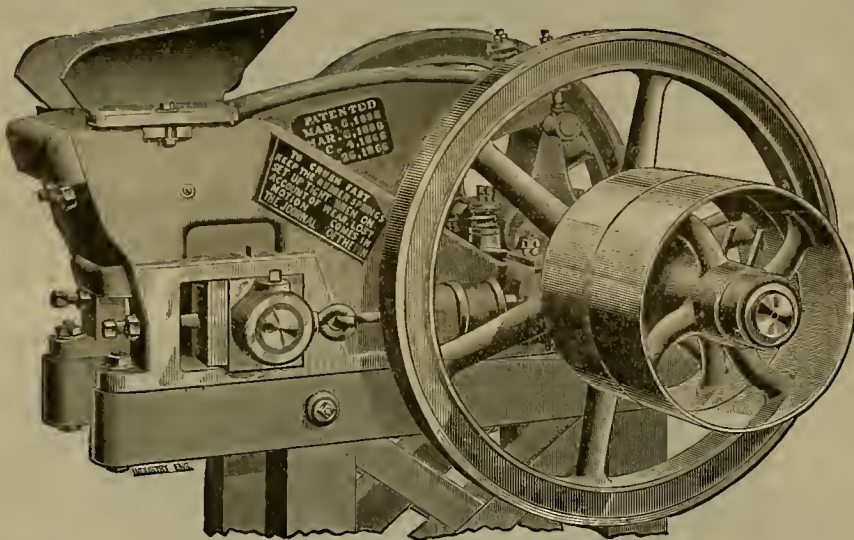
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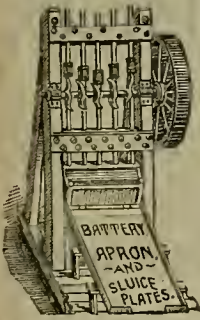
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Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper. SEND FOR CIRCULAR.



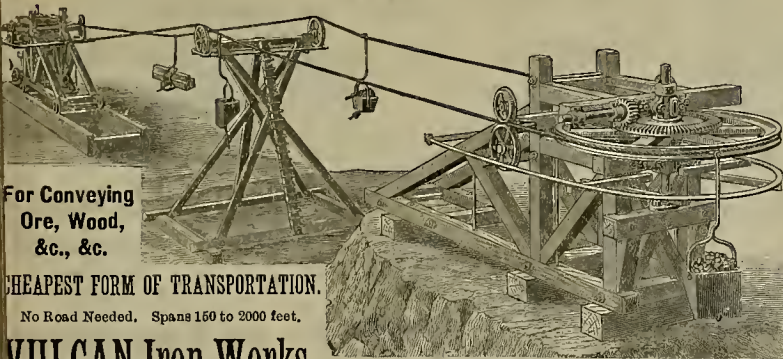
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VULCAN WIRE ROPEWAY.

(Patented.)



For Conveying
Ore, Wood,
&c., &c.

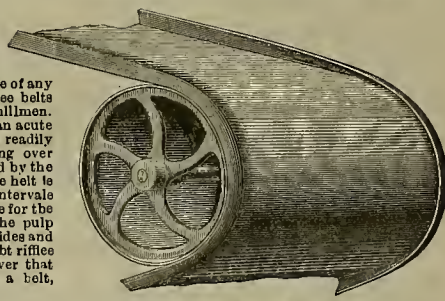
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No Road Needed. Spans 150 to 2000 feet.

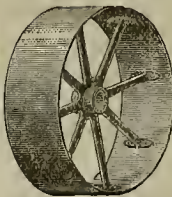
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THE BLASDEL CONCENTRATING BELT COMPANY.

We have now made arrangements to have our new Concentrating Belt manufactured in San Francisco; we can therefore fill all orders on short notice. The length and width of these belts are the same as is used on the Frue or Triumph Concentrating Machine, but can be made of any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen. First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers, thus the vibration and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight rifles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth.



H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.



PAT. OCT. 25, 1881.

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WM. T. BAIRD, Secretary.

OLDEST and LARGEST Manufacturers in the United States of

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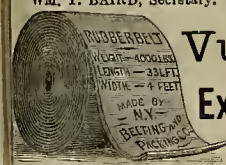
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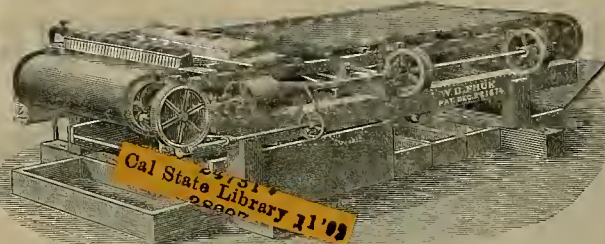
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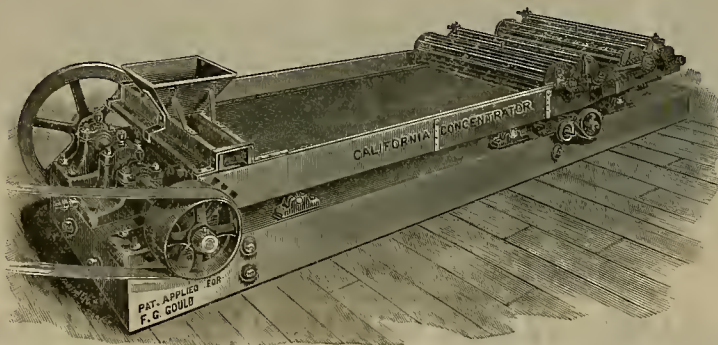
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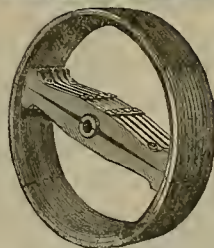
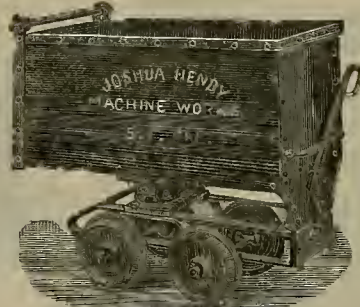
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SAN FRANCISCO, SATURDAY, JANUARY 23, 1892.

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1—Huntington Mills at Dalmatia Mine.
4—Dalmatia Mine—The Open Out.

3—St. Lawrence Mine—Dump and Mill.

2—Rock Creek Ditch.
5—Water Power Station at Mouth of Rock Creek.

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CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Practical Matte-Smelting.

Exposition of the Principles and Practice of an Important Art.

MINERAL, IDAHO, Jan. 9, 1892.

TO THE EDITOR:—Matte-smelting for the extraction of gold and silver from their ores is of German origin, but by the ingenuity of a few American metallurgists, it has been so changed from the previous foreign practice that we can safely claim it as an American process. Its principal distinction is that it is preeminently suited for the treatment of base ores, particularly sulphuretted varieties, and, generally speaking, all such ores as are or were classified as "refractory" or "rebellious," which are so easily treated by matting that those once used words have now lost their force and application. Nothing is too difficult for matte-smelting, and such substances as sulphur, antimony, arsenic, etc., which give great trouble in other modes of treatment are not only of no detriment in matting, but are actually, to some extent, of great use therein. The valuable metals which can be extracted by matte-smelting are gold, silver, platinum, copper, nickel, cobalt, and, less perfectly, lead. A large number of the so-called "rare" metals also come down. The percentage saved is rarely less than 90, and usually somewhat more. The saving of gold is the most perfect, and in carefully conducted work, is probably equal to the assay valuations.

WE FORM TWO SUBSTANCES IN MATTING, The slag and the matte. The latter contains the valuable metals united in a homogeneous mass of a specific gravity of above five, with sulphur and with more or less iron, lead, etc., according to the composition of the ore. The slag contains silica united with various oxides of the ore, or flux, principally oxide of iron or manganese, lime, magnesia, baryta, etc., none of which we desire to save. The proportion of matte to slag to secure economical results should be from one-tenth to one-fortieth, according to circumstances. It is in maintaining the proper ratio between them that the greatest skill and judgment are demanded, for it can easily be understood that if the proportion of matte is too large it will be too poor in valuable metals, and while the extraction may be excellent the matte will not pay so well for its subsequent treatment at the refinery. But on the other hand, if the amount of matte be small, say one-fortieth of the weight of the ore smelted, it will stand any reasonable subsequent charges for shipping to the refinery, and the commercial success of the operations will be great. Those who have an inkling of smelting will understand at once that the amount of sulphur in the smelting charge governs the amount of matte formed in the furnace. Experience in lead-smelting applies equally here, and we may also apply the rules for the formation of the slags practiced in the latter art, only that a much larger variety of slags are permissible in matte, than in lead-smelting. Thus, for instance, the bisilicate slags, found objectionable in the latter, give excellent results in matting, and for certain classes of ores are indispensable. In lead-smelting, as is well understood, the silica contents of slags vary, as a rule, from 26 to 40 per cent, while in matting we often make slags as high as 50 per cent silica, and even more acid ones have been used to advantage. This is an overwhelming advantage in case of siliceous ores.

Following is a list of the commonest constituents of gold, silver, copper, lead, nickel and cobalt ores, and the reader will understand from it whether or no the matting process is suited to any particular ores in which he may be interested, because the list is arranged with reference to the smeltability, if I may coin the word, of the different elements and compounds named, those that are the easiest to get rid of coming first in the list and proceeding successively to the more difficult ones. Thus, lime is easier to eliminate than magnesia, which in turn is usually regarded as less objectionable than baryta.

TABLE OF ORE CONSTITUENTS.

1. Water.
2. Lead as carbonate.
3. Iron and manganese as carbonates.
4. Iron and manganese as oxides.
5. Lime carbonate.
6. Fluor spar.
7. Dolomite.
8. Magnesia carbonate.
9. Baryta carbonate.
10. Gypsum.
11. Lead as sulphate.
12. Lead as sulphide.
13. Iron pyrites.

14. Other sulphides of iron (and manganese).
15. Compound silicates of the alkalis and alkaline earths.
16. Compound silicates containing alumina.
17. Simple silicates.
18. Heavy spar.
19. Quartz.
20. Zinc in oxidized compounds.
21. Zinc blende.
22. Titaniferous iron.

It is understood that this list refers only to the behavior of the above substances in a blast furnace. If we use a reverberatory matting furnace, as is sometimes done, the reactions are different and we would have to rearrange the table. Furthermore, the lay reader should bear in mind that there is no single one that contains all of the above substances, nor is it necessary that it should, for although an ore containing all of them in the proper proportion would be very easy to smelt, we can get quite as good results from one of a much simpler composition. The simplest ore, or mixture of ores, that we could treat in a blast furnace would have to contain (besides the valuable metal whose extraction we sought) sulphur, oxide of iron, and silica. Some of the iron would be reduced in the furnace and would then join the sulphur and form the matte, taking down the values. The remaining oxide of iron would combine with the silica and form slag. But arsenic and antimony serve the same purpose as the sulphur, and manganese acts the same as the iron; so neither iron nor sulphur are indispensable, though practically they are always present and perform the most important part in the reactions, always excepting silica, which we cannot do without. A large number of other substances are commonly present and perform more or less important parts, going into the slag or the matte, and serving sometimes a good purpose, sometimes a vicious one, according to the chemical reactions which are desired. From what has been said, it will be understood that the matting process has a

GREAT RANGE OF ADAPTABILITY.

For there are, it is safe to say, no mining districts in the world where these simple requirements cannot be met. Almost every mine produces sulphur in the form of sulphides, and some form of iron, or substances which take its place, and silica is almost the universal accompaniment of gold and silver ores. A custom smelter in South Dakota treats quartz carrying less than \$20 per ton in gold and silver, purchasing a quantity of iron pyrites to form the matte, and makes it pay, although the limestone flux necessary to slag so much silica actually weighs more than the ore! In this case the matte contains, besides the gold and silver, only sulphur and iron, while the slag, almost equally simple, contains only silica, lime, and a little magnesia and iron. The experience at this works, where 150 tons per day are smelted, proves that it is possible to smelt ordinary gold quartz at a profit—a thing never attempted before, and vastly beyond the conceptions of most men, who regard smelting as prodigiously expensive and only fitted for what have always been known as "smelting ores." One great establishment in Colorado treats a still larger amount of ore, purchasing with avidity everything offered, particularly such refractory ores as the lead smelters refuse as too difficult, and pays large profits, while competing against every known form of reduction process. At an establishment in Montana, where gold ores are treated by matting, the so-called pyritic process is in use, the distinguishing feature being the employment of iron pyrites, not only as a flux, but as a fuel!—a most valuable and interesting discovery, full of promise for the future. At Mineral, Idaho,

THE WORKS OF THE PORPHYRY COMPANY.

Under the writer's charge, deals with far different ores, which are of the rare kind known as self-fluxing, containing the necessary constituents for successful matting, almost without the use of fluxes—a remarkable feature. Beyond the high percentage of extraction which we attain and the complexity of our slags, and particularly of our matte, there is not much to say, unless it be that our operations are technically and commercially successful. A difference between our practice at Mineral and that of the South Dakota establishment is that, while we have just enough silica, the other concern has too much, and has to flux enormously to offset it. On the other hand, a smelting works (The Willows Syndicate) at Pretoria, South Africa, illustrates the other extreme of having neither silica nor sulphur in their ore. They have to flux with river sand to supply silica, while antimony, which is contained in the ore, serves as a substitute for sulphur, and their smelting goes on very well, forming antimonide of copper, the

so-called "speiss," instead of matte, which answers perfectly in taking down the silver.

Between the extremes, of all silica on the one hand and all base on the other, almost all valuable ores lie, and their treatment would, other things being equal, be less expensive than those of either the South Dakota or the South African establishments; while the variety of possible slags would probably be much greater. I spoke of the former works fluxing its ore with limestone; at another locality it might very possibly be cheaper, and it is quite feasible to flux it with oxide of iron or manganese or with baryta, or in certain cases even magnesia might do, especially if the reverberatory furnace were in use. In fact, it would be difficult indeed to name a gold or silver-bearing ore which we don't know how to smelt thoroughly and economically, and almost impossible to suggest a locality where we cannot adapt the matting process successfully. If we cannot melt the ore by itself, we can always add something else which we call flux to enable it to be melted, and if we can't use one style of furnace, we can another, and as I shall show, we can accommodate the process also to whatever kind of fuel there may be available. Before proceeding further with the discussion of the adaptability of matte-smelting to particular ores, we will consider the different

STYLES OF MATTING FURNACES.

The most work is nowadays done in large rectangular water-jacketed blast furnaces, three feet by eight or ten, at the hearth, with from 10 to 16 tuyeres, which are blown by huge pressure blowers, No. 6 or larger, with a blast pressure of eight ounces, and above. Such furnaces are driven at their very highest capacity, making campaigns of months, with a regular daily record of 100 tons and upward smelted. The South Dakota smelter treats 150 tons daily in a single furnace. At Butte, Montana, matting copper ores, even a larger capacity has been attained. A lead furnace of the same size would smelt about half as much.

An ordinary lead furnace water-jacketed makes a very good matting furnace, with a slight change of the bottom, costing but a few hundred dollars. The other apparatus of the lead plant requires no change unless it be increased blowing power. Smaller stacks than those mentioned are often used for matting, but the large ones are more profitable and easier managed and kept in order. A large blast furnace skillfully handled and provided with sufficient ore to enable long campaigns to be made, is by long odds the best dividend-paying plant in the world. The gross output of a single furnace may foot up a million dollars in a year.

However desirable the blast furnace in its present very efficient form may seem to us, we are not confined to its use should the character of the ores or fuel appear to be a bar to its successful employment, for the reverberatory does quite as good work within its sphere, and is capable of treating a greater variety of ores for there are many mixtures that cannot be handled in a blast furnace, but will be found well suited for the other furnace, and between the two there is no known mixture which we cannot smelt successfully and with a high extraction of the valuable metals.

THE QUESTION OF FUELS.

Almost every combustible can be utilized in matting. As a usual thing only coke and in charcoal are burned in the blast furnace, but late experiments show that bituminous coal and even wood may, to some extent, take the place of the more expensive fuels. At the Harrison Reduction Works, Leadville, coal is used along with coke. At Mineral, owing to the high price of coke (\$25 per ton), we replace half the allowance of coke with fir wood in large blocks and find quite a saving. Anthracite coal is very satisfactory in the furnace wherever it is cheap enough. The reverberatory is usually fired with bituminous coal, but wood is used successfully in many places and wherever gas-firing is practical almost any fuel is good enough. Thus, sawdust can be used in the gas-generators, or coal screenings, culm or other cheap fuel. The quantity of fuel burned per ton of mixture smelted in the reverberatory is about one-third the weight of the mixture, while in the blast furnace it varies from one-sixth to one-ninth only, showing a great advantage for the latter form of furnace. But this advantage is usually offset by the superior cheapness of the reverberatory fuel. To go into a detailed comparison of the two forms of furnaces would be foreign to the objects of this letter so we will dismiss the subject, again endeavoring to impress upon the reader that each furnace has its peculiar advantages and by their instrumentality we are able to successfully smelt any description of gold, silver, copper, nickel, lead, cobalt, arsenic, an-

timony or platinum ore that has ever been seen, or that can be imagined.

AVAILABLE FOR ANY ORES.

No ore nor complication of ores is too difficult for the matting process, and furthermore we are not obliged to expend any time or money in experimenting to find out just how to work any proposed combination; for by the simple agency of chemical analysis we are enabled, even before our furnaces are built, to decide upon the details of our proposed plant and the composition of our products. We know by the same means what amount of flux we shall have to add, and the capacity of our works in tons per day of our predetermined mixture. A process that gives such a control of future operations as this is surely superior in so far, to such as the silver lixiviation methods, where the most skillful metallurgists have to spend months in adapting their process to particular ores, and so far as I can see, never get beyond the experimental stage. It is the fashion in the mining districts to erect reduction plants which are not suited to the ore. It is also the fashion to own and work mines which have little or no "pay" in them. The two causes have produced a vast number of metallurgical (and, worse, financial) failures, and a great many more or less expensive lixiviating, amalgamating, concentrating and smelting works are idle and decaying. But I do not think that any matte-smelting works ever met with failure from inability to work the ores, though it is true that a scarcity of available ores will act as prejudicially to this method as to any other. As might be surmised, it requires a large and regular supply of ore to bring out all the advantages of any method of ore treatment, and matting is no exception to the rule. Especially in the use of the large blast furnaces do we feel its truth, and in case of a limited supply of ore it would most generally be advisable to adopt the reverberatory system.

COMPARISONS AND CONCLUSIONS.

Leaching, as applied to raw silver ore, is a failure; but as an auxiliary to matte-smelting it is of extreme usefulness. We can treat our mattes on the spot by roasting and then lixiviating by various solutions, separating silver, gold, copper, etc., according to the composition of our matte. If only gold and silver be present in an iron matte, the work is not difficult. Should there be a proportion of copper and it be desired to save it, the operation becomes more complicated, and very possibly beyond the resources of any small establishment.

We would not in general expect to make a complete separation of the values, working, as we probably should, in a rather crude and rough way; nor is it necessary that we should, for in every case the residues from such leaching would be returned to the smelting furnace, and whatever of value remained unextracted would be again taken up by the matte. Perhaps no process for gold extraction has ever been worked up to a higher pitch of perfection than the chlorination practiced in the quartz-mining regions of California, and, considering the character of the material, which consists of fine concentrates of nearly pure iron pyrites, with a little quartz sand, and considering also the high percentage of extraction attained by the process in vogue, it would seem that no smelting method could ever successfully supplant chlorination in those districts like the counties of Nevada and Amador, where it is chiefly practiced. But although fuel is very dear in those regions, and the requirements of smelting are otherwise difficult of attainment, I do not hesitate to say that it is as much as 15 tons daily of concentrates could be secured, matte-smelting, followed by chlorination of the product, would prove cheaper, and at the same time more reliable and thorough than chlorination alone, and, besides, the plant would cost less. The advantages of matting would become, of course, still more apparent if a notable quantity of silver were present or if the material treated contained talc, carbonate of lime, or other substances prejudicial to the creation of chlorine. An immense excess of fuel has to be used to obtain the "dead roast" desired in the chlorination of concentrates as at present conducted—enough, in fact, to carry out the matting process and fuse the ore in properly constructed furnaces. The same thing is often seen in roasting silver milling, an example of which I saw at the Yesso mill in Mexico, where, in treating 20 tons of ore per day, as much hard wood is burned as would serve to matte the ore, which is heavy spar, along with sufficient siliceous sulphuretted ore to flux it, the total expense of which operation would be about half of what it costs to treat the ore as at present.

ADVANTAGES FOR SMELTING.

No one who has attentively read the preceding paragraphs can fail to recognize such

ore as possessing certain advantages for smelting. Any mixture whatever that can be fused either by itself or in connection with other ores is in so far a smelting ore; and if the other conditions of smelting are present in a reasonable degree, the metallurgist would have no difficulty in deciding upon a smelting process. For example: The ore of the Santa Lucia mine in Honduras contains:

Lead, 5 per cent.
Zinc, 7 per cent.
Sulphur, 5 per cent.
Lime, 20 per cent.
Alumina, 6 per cent.
Magnesia, 2 per cent.
Carbonic acid, 13 per cent.
Silica, 29 per cent, with 90 ounces silver.
That of the San Francisco Del Oro mine,

preferably one familiar with the practical application of the process, for advice and information. The writer offers his services in this respect free of charge. Average specimens should be sent by express, prepaid, with full information as to quantity of ore, kind and cost of available fuel, fluxes, labor, and water supply. Analyses of carefully taken samples, if such have been made, will invariably be of great use in deciding upon a process. I should add that no part of the process as carried on at Mineral is patented, and therefore no obstacle exists to its adoption in that regard. The same thing is true as to its use in every other establishment in the United States, excepting that at Toston, Montana, where the modification properly known as pyritic smelting is practiced, this being patented. The average

A Great Aqueduct.

We are doing many original things in irrigation engineering in California. Some of our reservoir dams are the greatest of their kind in the world and involve novel principles and methods of construction. Some of our flumes and ditches which conduct water both for mining and irrigation, are peerless for ingenuity in location and ways of building and support. Still, for grand irrigation works California doffs her hat to India and the California irrigating purse shrinks when compared with the British Government treasure-houses which have been freely opened to bring water upon the arid wastes of Southern Asia.

The great public works for irrigation are of much interest to our people, and for this

Nadrai aqueduct, all the railway and road bridges below it were also destroyed, and many villages swept away.

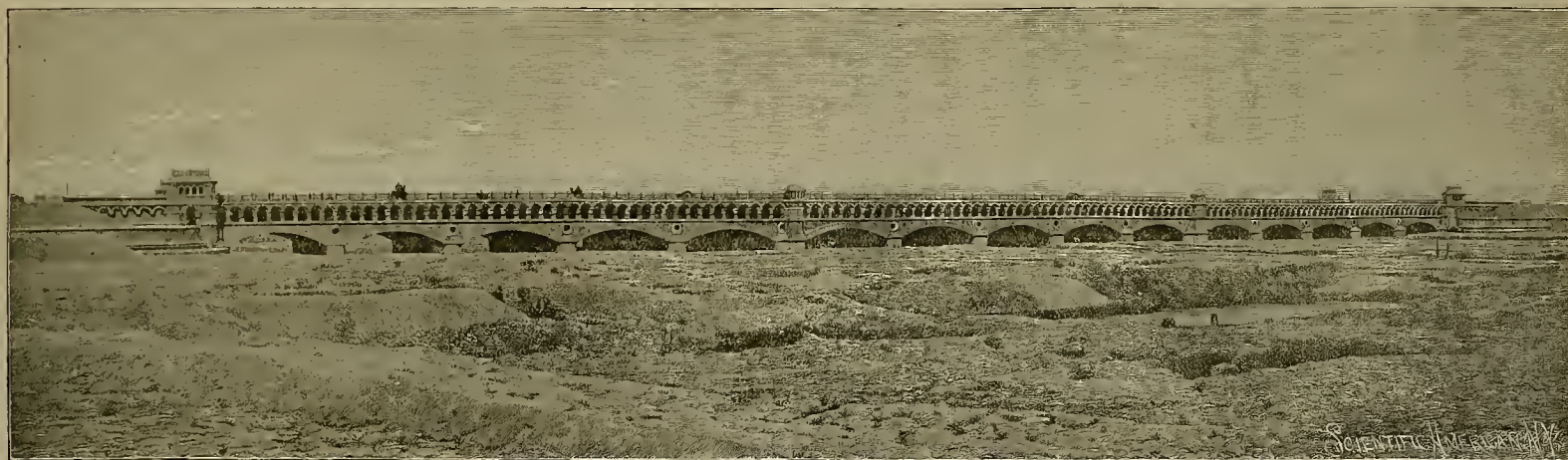
The proportion of the foundation to the superstructure of the new Nadrai aqueduct can be gathered from the fact that three-fourths of the expenditure of money and time were consumed by what is now hidden below ground.

The foundations consist of 268 circular brick cylinders or wells, as they are always called in India, all sunk 55 feet below the river bed. There are 15 bays of 60 feet, divided into three groups of five each by abutment piers. The abutment piers consist of a double row of 12-foot wells, spaced two feet apart, and the ordinary piers of a single row of 20-foot wells similarly spaced.

The wells are all sunk through a stratum



A GOVERNMENT ENGINEERING WORK IN INDIA—THE NADRAI AQUEDUCT—PERSPECTIVE VIEW LOOKING UP THE CANAL.



THE NADRAI AQUEDUCT—PANORAMIC VIEW OF THE DOWNSTREAM SIDE.

Mexico, contains:

Zinc, 24 per cent.
Lead, 12 per cent.
Iron, 7 per cent.
Calc. spar, 10 per cent.
Sulphur, 21 per cent.

Insoluble, 21 per cent, with 30 ounces silver; and finally the ores of the gigantic Huanchaca mine in Bolivia carry:

Copper, 7 per cent.
Lead, 12 per cent.
Zinc, 17 per cent.
Iron, 13 per cent.
Sulphur, 21 per cent.
Silica, 23 per cent.

Yet ores like these, which contain such a preponderance of bases that they are, in some degree, self-fluxing, and have even been characterized by an eminent metallurgical authority as "metallurgical fuels," are to-day made the subject of experiment as to their fitness for lixiviation, a process for which their complexity eminently unfits them.

EXAMINATION OF ORE SAMPLES.

Probably enough has been said to enable those unacquainted with the practice of smelting to understand its principal requirements, and to enable the fitness or unfitness of a given ore to be recognized. In case that there should be doubt concerning the applicability of matting to such ores, it will in all cases be advisable to refer average specimens to some experienced metallurgist,

amount of ore daily subjected to the matte-smelting process in the United States reaches the vast total of 2250 tons, of which some three-fourths are copper ores, but containing an important amount of gold or silver. The remainder are strictly gold and silver ores, but containing in most cases a little copper, a metal formerly supposed to be essential to the process, but which is shown by later experience not to be so.

HERBERT LANG.

MINES AND PROSPECTS.—There is a tendency among capitalists to overlook mining as a source of wealth and field for investments, simply because they are unacquainted with mining matters and mining as a business. They look upon mining as a question of luck only, being ignorant of the fact that "mines are made," in ninety-nine cases out of a hundred, and not found. Claims require capital to make mines of them. It is estimated that it costs \$20 a foot to sink a shaft or drive a tunnel. A poor prospector has a claim that has splendid indications, but he is stuck—the \$20 to sink the one foot is lacking, let alone the means to sink 200 to where treasures await his enterprise and pluck. It is rarely that he can secure help, for capital is afraid of the mining business; and yet an investment in good properties is sure to yield enormous returns.

reason we present in this issue engravings and text description of one of the largest irrigation works of its kind in the world which has been but recently completed. We are indebted for the facts to *Engineering*, an English journal. They show what can be done in handling water on a large scale where ample money is provided, and good professional skill is engaged.

The structure is known as the Nadrai aqueduct. The lower Granges canal, whose water this aqueduct carries over the Kali Naddi, was designed as an extension of the Upper Ganges canal, conceived and constructed by Sir Proby Cantley about the time of the mutiny, and was opened in the year 1876. In the year 1888-89, the Lower Ganges canal had 564 miles of main line and 2050 miles of minor distributaries, and irrigated 519,022 acres of crops. From this it will be seen how important a line of irrigation this canal constitutes, and how urgent the reconstruction of the aqueduct was. The new aqueduct replaces one of much smaller size, viz., five spans of 35 feet, which was damaged by a high flood in October, 1884, and completely destroyed by another high flood in July, 1885.

The Kali Naddi, for the greater part of the year, is a very insignificant stream some 50 feet in width only, but on the date mentioned, it was swollen into a river a mile wide and in places 25 feet deep.

In addition to the construction of the

of stiff yellow clay, averaging 15 feet thick, into a substratum of pure sand. The wells are all hearted with hydraulic lime concrete filled in by skips, and in each pier the wells, by corbeling out the brickwork, are joined together for the superstructure of the pier.

The total quantity of well-sinking was 15,019 lineal feet, or nearly three miles, and was executed by hand and steam-dredging. It was commenced in May, 1886, and completed in May, 1888. The arching was commenced in November, 1888, and finished in April, 1889.

The well-sinking and arching went on night and day, the work being lighted by ten arc lights of 2500 candle power each.

Now that the aqueduct is completed, it forms a most striking object in the vicinity, and will, *Engineering* hopes, stand to bear witness in far distant ages to the beneficence of British rule in India and to the skill of English engineers.

The solidity of the great arches and piers and the fine sweep of the bastion-like wings all unite to give an idea of vast strength and stability, while the monotony of such a large surface of facade is relieved by the effect of light and shade obtained by the bold corbeling out over the spandrels to form a support for a roadway on either side of the canal, and the long horizontal lines of the cornice and railings are broken up by a tower at each end and one at each of the abutment piers.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

GOLD MOUNTAIN.—*Ledger*, Jan. 16: This quartz claim at Quartz Mountain, under the able supervision of Mr. Farwell, is giving every indication of proving a valuable paying property. The ten additional stamps are in working order, making 20 stamps operating on the vast mountain of quartz comprised within the limits of the claim. The success of this enterprise—and its success is now looked upon as placed beyond the range of doubt—means a great deal—more, perhaps, than the development of any other single mine along the main belt. It is off the mother lode, at least 2½ miles to the east; but nature has piled up an enormous mountain of quartz, upon which a number of claims have been located. And the importance of the profitable operation of the Gold Mountain mine consists not merely in the working of that property, but also in the impetus and encouragement it will give to the opening up of the other locations.

KEYSTONE.—Twenty-five stamps of the mill are kept running steadily. The old Hendy concentrators have been taken out and replaced with five Woodbury concentrators, which are sufficient to handle the tailings from the five batteries.

MISCELLANEOUS.—It is reported that C. T. Crocker of Fitchburg, Mass., has bonded or purchased the M. M. Culbert claim at Rancheria. This mine is near Quartz Mountain, and on the same range as the Gold Mountain and other claims there.

Butte.

STANDARD GOLD CO.—*Oroville Register*, Jan. 14: The above named quartz mining company of Oregon City has recently begun operations upon the Cambria shaft. It recently opened what was known as the Bloomingdale shaft, and has yet three other mines to develop. From the present pumping and hoisting works, however, all of the other mines can be reached, so that it is the intention of the company to put in a four-stamp mill to crush what quartz is taken from the mine as the incline is cleaned out and new rock reached. This will effectually test the ore, and if it proves as satisfactory as it now looks, a ten-stamp mill will be erected in the near future. A. T. Graner is superintendent of the mine, and pushes work in the most lively manner.

INSKIP.—*Cor. Oroville Mercury*, Jan. 15: Our mining interests are a little dull on account of the snow. Most of the miners are taking their vacation. Messrs. Rooker & Lacy are drifting on the Great Euclid quartz claim and have struck good prospects. In the spring, they expect to put up a small mill and are talking of incorporating. J. W. Beese is taking out quartz, and hopes to make a good run. Pat Coffey is also taking out quartz, and in the spring will commence crushing. Messrs. Cory and Davis are working their placer on Williams ravine.

El Dorado.

A GEORGETOWN STRIKE.—*Republican*, Jan. 14: A letter received from Georgetown this week says that E. B. Gitchel has struck a bonanza and is taking out about \$400 a day in his ranch with one sluice box and a pan. One piece that he found weighs \$1011.50. Up to Monday he had taken out about \$3000. He is very accommodating, and stacks his large specimens out on the bank, permitting any one to examine them. Gitchel found the gold accidentally while turning some water for agricultural purposes on his ranch about a mile and a half from Georgetown toward Georgia slide. The gold is in the red soil of a small ravine, and only a few feet from the surface. It is the debris from a worn down quartz ledge, there being a little quartz attached to some of the gold, and broken quartz scattered through the soil. Another piece was found weighing \$400. The big nugget is now in the possession of Mr. Barklage of Georgia slide.

AGRICULTURAL STRIKE.—*Mt. Democrat*, Jan. 16: Edward Holmes and E. B. Gitchel at their ranch near Georgetown, on Friday of last week, while ground sluicing dirt from a hillside to fill up some land in which to plant clover, washed out a piece of gold worth \$1025. We are informed that during Friday and Saturday they took out about \$3000. There is no telling the extent of this agricultural streak, which, if it should pan out at the same rate for a few months, would yield quite a harvest.

Humboldt.

ORLEANS.—*Blue Lake Advocate*, Jan. 15: The mines have an abundance of water and are all running, and times on the river are therefore good.

Inyo.

MARBLE.—*Cor. Inyo Index*, Jan. 13: The Inyo Marble Company is making extensive improvements in their quarry at Inyo. A large lot of machinery for cutting the marble economically and in desirable shapes was received from the East a few days ago, while lumber for erecting the necessary boiler and engine-house has also arrived. Mr. Pidge, the Superintendent, states that they are busy getting out material for tiling the demand for which is increasing. With the new machinery, this Company's business will receive an impetus it well deserves.

Mariposa.

COULTERVILLE.—*Cor. Mariposa Gazette*, Jan. 16: The Thyra mill is running all the time now, with good prospects. I am informed that the ore is very rich in gold and sulphurates; the rock is so full of sulphurates that they have to use three concentrators in order to save them. If that is so, there must be a large quantity of them, as the mill is only a five-stamp one.

Nevada.

OSCEOLA MINE.—*Grass Valley Telegraph*, Jan. 13: Some parties in Grass Valley have secured a lease of the Osceola mine, near Rough and Ready, and intend working the same. Years ago the Osceola was owned by a party of Frenchmen, we believe, and a fine ten-stamp mill was built on the property. Sam Locke was at that time superintendent of the mine. But very little development work was done on the property and, for some unknown reason, the company quit work. The Grass Valley parties who have leased the property from Messrs. Huntress and Schroeder are now cleaning out the old tunnel and have found a new ledge, which shows gold freely. The croppings all along the ledge pan out quite flatteringly, and indeed it looks as though the boys were going to have a good thing.

THE HERMOSA.—The owners of the Hermosa mine are just now feeling quite confident that they have at last reached the goal for which they have long been striving—at the bottom of the shaft, which is 425 feet deep, a ledge over one foot in thickness has been found. The ledge shows free gold and is filled with mineral. A miner who went down the shaft to-day, tells us that the Hermosa looks better now than it ever did before.

THE HARTERY.—*Grass Valley Telegraph*, Jan. 15: Thursday the hoisting and pumping machinery of the Hartery Company was set in motion. Some time ago the plant was removed from the old location to the present one, on the Roach ground, and, as is not frequently the case, the machinery worked to perfection immediately on starting. The shaft on the Roach ground is down 150 feet. The company propose to sink 100 feet farther, and if developments at that depth warrant, to commence drifting; if not, to attain necessary depth.

A RICH STRIKE.—Messrs. Cole and Williams, who have been working a ledge just above Washington, struck it very rich Wednesday. The ledge is a large one, being about five feet thick, and is full of gold. The strike is regarded as one of the best ever discovered in the Washington district.

NORTH BANNER MINE.—*Grass Valley Union*, Jan. 14: The mill of the North Banner mine, which has not been crushing for several weeks, will start up again to-day. The work on the 500 level is now going on regularly, the drift being extended north and south from the shaft, as the water, which has been more or less troublesome for several months, is now under control. The vein is opening up in good shape and yielding a fine quality of ore, and the working force of the mine is being gradually increased. The work of making an upraise from the adit level to the surface, is making favorable progress, and when completed the ores will be raised directly to the surface. The company will make important surface improvements during the present year, to add to the facilities of working the mine and handling the ores.

Plumas.

JOHNNY BULL MINE.—*Plumas Co. Bulletin*, Jan. 14: Since shutting down their mill late in the fall, the owners of this property have been energetically at work running their main tunnel ahead, and a new body of ore has been developed. Crusing will be resumed on Monday next, with the prospect of a continued run, as this property is so situated that the storms of winter do not interfere with the progress of work upon it.

SAVERCOOL.—The prospecting work that has been constantly under way on this property is said to have recently opened up a fine ore body and it is reported that the mill will resume crushing as soon as the season opens. Pat Maloy of Bucks Ranch is in town, on his way to Reno, there to conclude a sale of a half interest in his mine to Comstock capitalists. They have made him an offer, and he has concluded to accept it. His mine, the "Needed Wealth," is three miles northwest of Bucks Ranch, on Bucks creek, and it was discovered about 18 months ago. It can be tapped 800 feet deep. The ledge is from six to ten feet wide and prospects well. It is well located for a water power mill. August Goehle of Crescent has purchased the half interest of his partner, Will Roedde, in their placer claim on Rush creek, paying him \$1000 therefor. This mine can be worked for a few weeks only each season by water from the melting snow, but is said to have yielded over \$3000 a year. It is said to be definitely concluded that a mill will be erected in the spring upon the McIntyre-Warren ledge at Wolf creek. The owners of this property have been working upon it for several seasons, and the construction of a mill will prove their faith in its value.

BROWN'S HILL MINES.—*Oroville Register*, Jan. 14: Paul Willett and James Wheeler of Brown's Hill were in town on Tuesday, and from them we obtained some items concerning the mines in that locality. Brown's Hill is across the line into Plumas, but the miners come this way to do their trading and transact their business. At present there is too much snow to do much work, but when spring opens there will be a large number of mines opened and developed. Among these will be the gravel mine of Wheeler, Bills & Co., the quartz ledge of James Wheeler, and another owned by George Wheeler. Mr. Willett lacks only about one week's work of striking his ledge in the tunnel that he has been running. He has no snow sheds up on the outside, so he cannot work any more till spring. Mr. Wheeler tells us that this ledge is so rich that in any part of it the work will yield considerable gold by pounding up the ore in a hand mortar. There will be 12 or 15 mines developed here next summer.

San Diego.

BANNER AND JULIAN.—*Sentinel*, Jan. 14: The mill of the Banner Mining Co. has been quiet now for several days, awaiting ore. Bob Walker and partners are employing their time

with profit upon their fine property, the Chaparral. The owners of the Empire mine at Banner have improved their property by putting a new track and car in place, thus rendering easier their work of development. The rush of assessment work is now over. Several properties, some of considerable value, have changed owners since the first of the year, by reason of failure to comply with the law in this particular. James Lowe and partner, Morris, are doing swimming work upon their contract in Helvetia. They are clearing out the drifts of the old works and timbering well as they go. Considerable ore is coming up the shaft, upon which the stamps employ their time as long as they have water.

Shasta.

FROM IGO.—*Cor. Shasta Courier*, Jan. 16: At the Crystal a drift has been run north about 35 feet, and 60 sacks of ore were shipped therefrom. Sinking has been resumed, and they are now down about 16 feet below the tunnel level; the ledge showing excellent ore all the way. A drift run on the ledge a few feet east of the one now being worked shows some shipping and considerable milling ore. Some work is also being done in searching for the back or west ledge in the lower tunnel. The Eubank ledge has materially improved, and they have made one small shipment. W. D. Bull has been timbering and covering his shaft, and is now in shape to work in wet weather. He has about several tons of fine ore. Robinson & Son have been doing assessment work lately. One shipment has been made since my last. The returns were satisfactory, and more will be shipped when the weather permits. Wright & Sons' ledge is looking as well as ever. The water has been troubling them some the past month. The snow closed the arrastres down for a week or more, but all are gridding again. Shirland's on Pacific, E. L. Ballou's on Falls, and Moody's on Continental ore. W. O. Cooper is sinking on the Chico below the tunnel level, and getting some fine ore again.

Siskiyou.

GOLD DUST.—*Yreka Journal*, Jan. 15: The miners on Cottonwood creek will undoubtedly take out considerable gold dust this season, on account of having a good supply of water from the snow on Siskiyou mountain, to keep the streams and ditches supplied until late in the summer. The snow is melting just right to be of great benefit. Two years ago we had as much snow, but it was dissolved too rapidly by warm rains, so that but little work could be done until late in the spring, owing to streams being too high for miners to manage them. Lee, Lash & Co. at Greenhorn blue gravel mine were prevented by the late heavy snow storm from moving their steam pumping and hoisting machinery to the new shaft, and commenced washing over old tailings with an abundant supply of water. The tailings from the ground worked at their old shaft has been paying handsomely, and they have immense quantities which they piled up for this express purpose. Quinne, the electric light man, will soon make preparations to raise water for a ditch to be built on the side of the high ridge northwest of the town of Hawkinsville, four miles from Yreka. There is no doubt of the existence of a large extent of very rich ground on the foothills and on the flats, never before worked for want of water, much of which is owned by James Quinne and George Simms. The McCoy Brothers bought a claim in that locality in the '50 period from A. E. Schwatka for \$1000, and for some time after opening realized at the rate of 15 pounds of dust or \$3000 every day. We see no reason why there should not be considerable more rich ground at and near the old McCoy diggings. Rodgers & Co., who purchased the upper Greenhorn ditch, heretofore used at the Chinese hydraulic claim just north of town, have extended it to Canal gulch, some two miles farther north, where they are now using the water on rich diggings lying dormant for want of water to sluice with. The company have expended about \$1400 in the extension.

NEVADA.

Tuscarora District.

COMMONWEALTH.—*Times-Review*, Jan. 15: Joint raise from south drift extended 22 feet in the vein, giving low assays.

NAVAJO.—South drift, 350-foot level, extended 13 feet, giving low assays in the face. An intermediate drift has been started below the 350-foot level, progress eight feet, vein small but very rich.

NORTH BELLE ISLE.—No. 4 north drift on the south 500-foot level extended 22 feet; the vein is of good size and is showing considerable heavy sulphuret ore.

BELLE ISLE.—Work has been resumed in No. 1 winze, 350-foot level. No. 1 vein, north intermediate drift on No. 2 vein, below the 350-foot level, extended six feet, showing some rich ore. The stopes are without much change.

NORTH COMMONWEALTH.—Second level: Stopes above the level continue about the same, yielding seven cars first class ore, assay \$290 per ton, and 55 cars second class, \$35 per ton. Winze is down on inclination 45 feet, with some good ore mixed through the vein. Started west drift to cut the winze ore body on the level.

NEVADA QUEEN.—Fourth level: West cross-cut raise extended 12 feet, showing spar with spots of ore. Joint raise at the lode extended 22 feet in vein formation giving low assays.

DEL MONTE.—Second level: Stopes being opened on the line of North Commonwealth show improvement; extracted seven cars first class ore, \$256 per ton, and 42 cars second class, assays \$35 per ton; nine tons of ore shipped, assays \$226.

Lida Valley District.

RICH ORE FROM LIDA.—*Walker Lake Bulletin*, Jan. 13: J. Goldner brought into Candelaria last week some yellow chloride ore, from the Florida mine at Lida Valley, the property of

Len Martin, which, if the fortunate owner only has enough of it, will make him rich in a short time. Prof. Storch made an assay of it which went 4217 ounces of silver to the ton. The ore was obtained at a depth of 60 feet from the surface, at a point newly opened, and distant about 50 feet from any other point where ore had previously been found. Mr. Martin is now taking out ore for shipment.

Osceola District.

HYDRAULICKING.—*Nevada Transcript*, Jan. 14: The Osceola hydraulic mine, superintended by J. H. Marriott of this county, is located a little over the Utah line in Nevada. The company have kept their plants and sluices running nearly all the past season. The cleanup has not as yet been made public, but it is said to be quite satisfactory. The company own two fine ditches, 16 to 19 miles long, each having a capacity of 2500 miner's inches, and giving water enough to keep miners at work from early spring until frost closes the streams in winter. Some 15 to 20 men are employed. The gravel bar on which they are operating has been prospected over hundreds of acres, and its yield is estimated at 17 cents in gold per cubic yard, but in operating, it has run as high as 25 to 50 cents. Between two and three hundred thousand cubic yards can be washed out annually now, the company having provided themselves so well with water. In the beginning of the washing of this bar it was thin, but it now has a breast 100 feet high, on which the monitors play with a water pressure of 225 feet, and enough water is used to run the bed-rock flume, which is four feet wide and four feet deep, full most of the time. A dynamo run by water power supplies the electric lights for night work. The company also own a number of good quartz lodes, a quartz mill and ranches in the vicinity. The gold found in these bars is in the form of small grains up to nuggets weighing six pounds, a large one having been found lately worth over \$2000, and which is a mass of pure gold mixed with quartz.

ARIZONA.

CROWNED KING.—*Prescott Courier*, Jan. 11: Word comes from the Crowned King mine that N. C. Sheekels is running the mill day and night, has a good force of men working in the mine, and is turning out large quantities of rich ore. The camp is quite lively. The Crowned King is one of our biggest bonanzas, and the *Courier* is glad to know that it has started in to lead the procession of bullion-producing mines, which it is almost certain to do.

TIGER.—Deputy Sheriff Rybon returned from the Bradshaw country on Saturday last bringing with him \$6000 in bullion from the Tiger mine. He states that a very rich strike is reported in the Swallow mine, about seven miles below the Castle Creek smelter; that all the snow has melted in the vicinity of the Tiger mine.

IDAHO.

NEW REDUCTION CO.—*Boise City Statesman*, Jan. 14: The machinery for the foundry, pattern shop and machine shop of the Boise Iron & Reduction Works has arrived in the city, and as soon as the frost leaves the ground the work of constructing the buildings of the establishment will be commenced and pushed to completion. The machinery seems to be of the first grade, and will no doubt give perfect satisfaction. The directors of the company have decided to raise an additional \$7000, the money to be devoted to the erection of a stamp mill and a smelter in Boise. The city is now being canvassed by a committee, and as soon as the money shall have been raised or guaranteed the plant will be put in place.

DE LAMAR.—*Nugget*, Jan. 14: The De Lamar Company shipped out eight bars of bullion this morning, the result of the partial clean-up for the first nine days run in January. These bars will average close to \$2000 each. The mill is now running smoothly and crushing between 70 and 80 tons of ore per day. The amount of ore sacked and sent to be sold to smelters has been considerably increased. The De Lamar Company has had plans made and in a few days will begin the construction of a furnace for roasting a portion of their ore.

FLINT.—Several parties were over from the Flint district last week who say that the Flint mill is now running steadily night and day and turning out high grade concentrates, and that the company is continuing to ship rich rock. The big Corliss engine will be running in a day or two more. The dynamo to drive the electric drills has been set up and will be started with the new engine. These drills will be employed in diving the tunnel from the mill to the mines, and when completed electric cars will be used to deliver ore.

MONTANA.

ANACONDA.—*Butte Bystander*, Jan. 13: Notwithstanding the long shut-down of the Anaconda, the past year has been a prosperous one, and the properties opened up and worked will add greatly to the output of Butte in the future. Nearly 5,000,000 ounces of silver has been sent East from the mines of Butte this year, not including the amount shipped by the Anaconda or Boston and Montana. We have no means of knowing how much the Anaconda has shipped East, but that shipped by the Boston and Montana must have reached over 200,000 ounces. It is improbable that the silver produced in the mines of Butte will amount to 7,000,000 ounces. The Anaconda mines, including the syndicate properties, are not being operated to their full extent, only sufficient ore being taken out to supply the lower works at Anaconda.

THE BOSTON AND MONTANA CO. are taking out all the ore the smelter in Meadville can handle. The output will be greatly increased when the smelter at Great Falls is ready to begin

operations. Both the company and the Montana Central Railway are making preparations to handle the immense output of ore the great smelter will require when it once begins operations. The company have mortgaged their smelter at Great Falls, to secure the bonds issued, in the sum of \$600,000 to put in an electrolytic plant at Great Falls for refining their matter. The deed transferring the Valley claim to the Bannister mining company shows that the price paid was \$110,000. This claim adjoins the Vulcan on the south, and recent explorations have uncovered some very rich ore that will run up into the hundreds. This purchase will double the value of the property belonging to the Bannister mining company, and may lead to the sinking of a three-compartment shaft at a place from which both the claims may be worked economically.

MERRIMAC.—John Hegg, the owner, has sold to a syndicate, through Dan Simpson, a one-half interest in the Merrimac lead, the western extension of the Upper Big Ox at the head of Deer Creek, east of Marysville. The property is developed by a shaft sunk on the lead to the depth of 105 feet, which disclosed a good pay streak of milling silver ore which assays above \$90 a ton, 50 tons of which have been extracted in sinking the shaft.

NEW PROCESS.—Bntte *Inter-Mountain*, Jan. 13: It is understood that a new process of smelting is to be inaugurated at the Boston & Montana Works at Great Falls when they are started. Work is being vigorously pushed now. The new process is to use gas for smelting. For this purpose, a gas house is now being constructed and Sand Coulee coal is to be used to make the gas. It is said that a very strong and steady heat can be obtained from gas, which will be introduced into the furnaces through pipes. Drs. Mitchell and Mussigbrod have bought the claim adjoining the Royal on Flint creek and paid the owners, Willard Bennett and Mr. Turney, \$25,000 for it. H. L. Frank to-day sold 465 feet on the west end of the Philadelphia claim to the Colorado Co. for \$15,000. By a break in the main shaft of the engine at the Bi-Metallic mine yesterday evening, all work has been suspended. Three hundred miners are laid off until a new shaft can reach the mine. The crack is said to be due to crystallization.

NEW MEXICO.

BREMEN MILL.—*Southwest Sentinel*, Jan. 13: At the Bremen mill of the Grant County Mining and Milling Co., in this city, the bins are full of ore and the mill running to its full capacity, 15 stamps, night and day. A cleanup was made yesterday of a run of one hundred tons for John Brockman, from his mines at Lone Mountain. One hundred tons of ore from the Uncle Sam mine, at Cow Springs, which the company is working on a lease, are now at the mill and four teams are hauling steadily from the mine. A large lot of ore from Manuel Taylor's lease on the Providence mine, in Chloride Flat, is now being run through one battery. The company also has a contract to work several hundred tons of ore from the Sherman mine for W. H. Newcomb.

A MILL AT LONE MOUNTAIN.—At last, after all these years of solicitation and after numerous disappointments, Lone Mountain is to have a mill for the reduction of its ores. John Brockman has bought the Telegraph mill, on the Gila, and will remove it to Lone Mountain at an early date. Mr. Brockman has had hundreds of tons worked from his mines at Lone Mountain, and the placing of a mill at that point will not be an experiment, but an assured success from the start.

ST. HELENA.—*Silver City Enterprise*, Jan. 14: Operations on an extensive plan have been commenced on the St. Helena claim at Central. Fifteen men have been put to work by Judge Woods, the superintendent of the property. The development work is being carried on by a crosscut from the south shaft at a depth of 100 feet, which will intersect nine veins within 60 feet. These veins range in size from one foot to five feet in width on the surface, and as several of them converge in their downward course, the junctions of some of them may be found at this depth, and will possibly disclose ore bodies of great extent. The average value in gold on the surface is said to be above \$20 per ton. The upper shaft will be sunk to a depth 110 feet, when drifting will be prosecuted on the 100 foot level. When the development work shall have shown sufficient ore in sight to warrant it, a mill will be erected near the mine. The St. Helena is principally held by Judge Woods, John M. Wright, H. H. Whitehill, Gustav Wormser, Eugene McComas, W. H. Lyford. The present work is being prosecuted at the expense of L. T. Dickason.

OREGON.

A PROSPEROUS DAWN.—*Bedrock Democrat*, Jan. 11: The placer miner will have plenty of water next spring, and will make the most of it. Already we hear of placer owners making preparations for the coming season, which give promise of proving the best we have had for many years. From every district, most promising reports are received. Owners of quartz claims are putting in the winter developing their properties, and with the opening of spring, many new mines will be added to our fast increasing lullion producers. The mills on the various mining properties in this vicinity are pushed to their fullest capacity, and the outputs are very satisfactory to all concerned.

MINE SOLD.—The necessary papers have been made and executed transferring the ownership in the McGinty mine, situated in the Elkhorn mining district. The ledge was discovered by Mr. Daniel Robbins, who did very little development work; but enough was done to disclose a fine vein of ore, and the property has a promising future.

WASHINGTON.

WATER SUPPLY.—*Ellensburg Capital*, Jan. 14: Almost every day now more snow is being added to the already deep fall in the mountains, from whence the water supply for our valley comes. According to some reports, there is already more snow there than has fallen in several years, and all agree that it is unprecedented for this stage of the season. It is already from 12 to 15 feet deep on the summits to the north, and the usual weather for snow is only beginning. There consequently need be no hesitation in predicting plenty of it in the mountains this winter. It means a great year in the mines, for water is one of the greatest necessities in a mining region, and this year it will be abundant. It means that work can and will be prosecuted on a larger scale than ever before, and of course the output should be correspondingly increased.

Delegates to the State Miners' Convention.

The following list comprises the names of delegates from the various counties of the State, as reported to the Secretary of the Executive Committee of the Placer County Miners' Association. Some of the delegations were appointed by the miners at their meetings, and others by the Boards of Supervisors of the respective counties. It is proper to note that the list is printed as prepared before being submitted to the Committee on Credentials of the convention.

ALAMEDA.

Blood, W. F.
Bortree, David.
Barrett, John.
Blasdel, E. W.
Burnham, Chas. F.
Blasdel, H. G.
Bradley, John T.
Colyer, John.
Carmany, Eugene.
Carter, George A.
Copeland, Isaac.
Coleman, Nicholas J.
English, Warren D.
Ewing, Allison.
English, William D.
Evas, Taliesin.

AMADOR.

Avendale, W. B.
Anderson, W. G.
Bradshaw, Clarence.
Barney, E. S.
Ball, Sr., O.
Campbell, W. C.
Crain, A. J.
Downs, R. O.
Devore, Gideon.
Eckert, P. A.
Fontenrose, F. J.
Fratte, F.
Graham, James.
Graham, John.
Howland, C. P.

BUTTE.

Belding, C. C.
Burwell, L.
Duncan, Sr., W. E.
Ekman, A.
Ferguson, O. G.
Fowler, W. H.
Fogg, E. W.
Frery, A. P.
Gale, John.
Hendricks, W. C.
Harris, N. A.
Hemesley, John.
Hunter, G. C.
Harris, W. J.
Hendley, Joe.

CALAVERAS.

Burt, J.
Borger, O.
Buckminster, P. S.
Orsabe, Wm.
Cleary, W. H.
Copeland, Isaac.
Clark, W. V.
Davis, J. V.
Dunbar, Willis.
Enright, J. E.
Foorman, I. S.
Getchell, O. W.
Cain, I. R.
Horswell, F. J.
Ida, N. A.

COLUSA.

Ash, Wm.
Argyle, J. F.
Boyes, Jo'n.
Boyes, S. W.
Bedell, J. O.
Baldson, James.
Browning, J. W.
Cain, I. R.
Clark, W. J.
Olark, R.
Crutcher, J. W.
De Jarrett, J. B.
Farnsworth, Joseph.
Green, W. S.
Goud, J. W.

EL DORADO.

Alderson, T.
Armstrong, J. Z.
Alexander, L. L.
Brown, J. M.
Bacon, F. P.
Barkle, W. S.
Bawford, J. J.
Carneuter, G. J.
Coleman, N. J.
Chapman, E. W.
Davenport, E. V.
Greer, E.
Harvey, W. H.
Harmon, D.
Heald, J. O.

Goucher, G. G.

Buhne, H. H.
Baxter, W. W.
Bridgman, A.
Bussell, P. F.
Beach, C. E.
Brown, T. M.
Lusk, S. M.
Cason, Wm.
Carr, John.
Chapman, J. G.
Dolbeer, John.
Draut, Frank.
Dohyn, W. B.
Foot, A. N.
Fernald, R. M.
Haynes, J. F.

HUMBOLDT.

Harpst, Geo.
Harpst, John.
Hray, F. R.
Johnson, Chas.
Kramer, Geo.
Lord, Wm.
Minnor, Isaac.
McCrack, W. P.
McCrack, J. M.
McFarlan, Alex.
Olmstead, W. T.
Pruitt, Frank.
Pearch, J. A.
Whipple, S. G.
Wildner, F. F.
Williams, Geo.

Elbeshtz, M.

Fitzgerald, Frank.

Applegate, D.

Bennett, O. F.

Brown, A.

Baker, T. A.

Collins, Barney.

Davis, Brooks.

Eveland, J.

Ferguson, S. W.

Fontaine, Joseph.

Greene, P. D.

Hirshfield, H.

Harrington, W. E.

Hasslem, Jas.

Johns, W. H.

Lightner, D. S.

Alter, Isaac.

Alexander, D.

Atkes, N. J. M.

Barker, J. C.

Boggs, L. N.

Brown, A. N.

Beattie, R. M.

Chamberlin, M. R.

Davey, H.

Everett, A. J.

Greene, W. E.

Hahlsbaw, T.

Hanson, D. A.

Hanso, N. E.

Hudson, R. I.

Abbott, W. H.

Anderson, W. N.

Boyd, J. T.

Lassett, T.

Barney, C. S.

Bullis, R.

Bonnetti, L.

Cobb, H.

Desala, H.

Evas, W. D.

Freeman, W. D.

Grandi, S.

Gelske, L.

Gordon, L.

Grey, Polk.

Gillett, Chas. E.

Gaskill, V. O.

Goodman, George.

Gulpin, L. T.

Hall, R. M.

Livermore, H. P.

Merritt, Jas. B.

McKusick, H. J.

Newson, John J.

Rutherford, Chas. B.

Radtke, John.

Sherman, Edwin A.

Smith, F. M.

Tuttle, Hiram S.

Jones, Jud. C.

Jones, W. T.

McVayne, A.

Murphy, Geo. P.

Parks, J. F.

Pony, W. M.

Randolph, M. O.

Sharp, C.

Tregloan, J. R.

Tregloan, John.

Tripp, H. T.

Voorhees, E. C.

Woodford, J.

Wehler, R.

James, William.

Lott, O. F.

Lasater, L.

McLaughlin, Col. F.

McColligan, J. S.

Morgan, J. S.

McIntyre, Wm.

McGrath, E.

Nickerson, O. J.

Price, E. B.

Perkins, D. K.

Reardon, H. V.

Stowe, H. P.

Wagner, John.

Woods, J. P.

Johnston, Wade.

Keefe, R.

Lane, C. D.

Lake, S. S.

Moser, S. S.

Moore, O. J.

Messenger, H. A.

Moore, E. B.

Morse, F. B.

Reed, I. H.

Storey, Jno.

Southwick, J. H.

Teak, J. F.

Thomas, Wm.

Weston, J. H.

Hager, George.

Hubbard, W. H.

Hedlin, G. B.

Harlow, T. H.

Harrington, E. A.

Harrington, W. F.

Jones, E. F.

Monkton, L. E.

Packer, G. F.

Pearl, E. C.

Rose, A. H.

Sutton, G. M.

Farnsworth, J. C.

Tully, J. A.

Tully, W. R.

Lane, S. A.

Morey, H. S.

Morgan, D. W. O.

Nelson, J.

Polk, J. B.

Raw, R. S.

Roland, R.

Read, C. I.

Schultz, C.

Stevenson, T.

Smith, J.

Snow, T.

Sipp, J.

Watt, P.

Young, O.

INYO.

Hawley, A. M.

Reddy, P.

KERN.

Lightner, A. T.

Lohmeier, Fritz.

Morgan, A.

Miller, J. O.

McLeod, A. J.

Mann, Hugh.

Mezzell, W.

Price, B. T.

Robinson, Jerry.

Sumner, J. W.

Sherma, C. E.

Tracy, T.

Wille, S. W.

Wilson, W. O.

Walker, W. B.

LAKE.

Jamison, J. H.

Lightner, H.

McCluskey, H. A.

Munz, M.

Morse, J. H.

Parsons, W.

Reed, H. M.

Rocca, A.

Ramsdell, J. U.

Smythe, F.

Van Light, I. S.

White, R.

Waltonberg, F.

Whitton, W. T.

MARIN.

Hannon, John.

Harrison, J. N.

Hubbell, O.

Hick, T.

Kirk, M.

McOne, J. S.

Miller, W. J.

She, John.

Snell, Jacob.

Sole, W.

Tunstad, Jas.

Fox, S.

Thomas, G. W.

Woods, Sam'l.

Wash, F. S.

MARIPOSA.

Mast, O. L.

Reynolds, Frances A.

MERCED.

MONO.

Folger, R. M.

NAPA.

McFarland, A.

McMillan, Antonio.

Newcomb, B. M.

Osborne, Joseph.

Patten, Dan.

Reynolds, J. N.

Rhodes, M. G.

Rhodes, Henry.

Smith, W. D.

Taher, Horace.

NEVADA.

McBride, J. S.

McLean, G. D.

Miller, R. D.

McKillican, D. R.

Mather, J. G.

McMurray, R.

Nihale, G. C.

Place, H.

Searies, Niles.

Tregidgo, A.

Turner, G. E.

Tully, Edwin.

Walling, J. M.

Weisheln, Joseph.

Wiltse, E. A.

ORANGE.

Jacob, H. G.

Masco, C. S. M.

Maloney, O. P.

Mitchell, J.

Pitney, D. C.

Raisley, E. E.

Scott, W. M.

Thomson, R. S.

Williams, W. H.

Williams, W. A.

Wood, F. A.

Wright, C. L.

West, T. A.

Webster, T. J. C.

Wilbur, F. M.

PLACER.

Nichols, T. J.

Neff, J. H.

Patterson, J. B.

Power, H. T.

Sanders, F. I.

MECHANICAL PROGRESS.

Labor-Saving Inventions in England and in the United States.

The following remarks from an English correspondent of the *American Manufacturer* will be read with much interest in connection with three of the articles which follow under our standing head of "Mechanical Progress" for the present week. These three American inventions, which have only quite recently been placed before the world, may be considered as nearly, if not quite, equal in importance to the other great inventions referred to by the English writer and addressed to our cotemporary already named. Americans may well feel proud of the record. Under date of Dec. 9, 1891, the English writer proceeds as follows:

"In the employment of machinery, America leads the van. This statement has been made over and over again, and as the years go by, events but confirm its correctness. America seems to be more alive than any modern nation to the fact that manual labor is about the most expensive method of production that can be adopted, and consequently the tendency in your country is to the use of automata to as great an extent as possible.

"In labor-saving appliances, you are distinctly ahead of us. There is much truth in the statements of those who allege that in the application of science to social and industrial uses, America is far in advance of other nations. Undoubtedly, many of the most important practical inventions which have contributed to the progress of the world during the past century originated with Americans. There are those who hold that no other people have devised so many labor-saving machines and appliances, and who point out that the first commercially successful steamboat navigated the Hudson, and the first steamship to cross the Atlantic sailed under an American flag from an American port, while to American ingenuity is attributed the cotton gin and the first practical mowing, reaping and sewing machines.

"The wisdom of your labor-saving policy becomes increasingly evident with the lapse of time, for everything points in the direction of increasing international competition, with the result that the nations must cut down those costs of production in which labor is so heavy an item. Incessant improvements in the application of machinery, and of various forms of motive power, show that many processes for which the human hand is now indispensable, will soon have machines adapted to them, and these, if not altogether displacing human labor, will render one man capable of producing or rather of superintending the production of a quantity of manufactured articles now requiring 10 or 20 or more workmen, whose energies will, however, be thus set free for service of perhaps a more useful character, both for themselves and for the nation, than those duties of a mechanical order which can be performed by machinery."

A Great Improvement in Cutting Lumber.

A new and valuable lumber-cutting machine was recently subjected to a most successful trial at Greenport, Long Island, in the presence of several of the most prominent lumbermen of New York. The experiment was highly successful, both in the superior character of the work turned out and in the speed and economy with which it was done. It was pronounced far ahead of any sawing device ever employed for such purpose. It will cut lumber of any thickness, from one-thirty-second of an inch to two inches in thickness. It will take a log eight feet long and cut boards at the rate of 40 a minute of any given thickness. There is not the slightest waste of material in the cutting. It is calculated that when *saws* are used, one-fourth of the wood is wasted in sawdust and planing if inch boards are being cut. In sawing boards one-sixteenth of an inch in thickness, the loss is 215 per cent of the material.

The machine is 42 feet long, 15 feet wide and 8 feet high. The object of the machine is to economize time, cost and raw material. The output of a single machine, when in good running order, is set down at from 80 to 100,000 superficial feet per day.

It is claimed that this new invention will revolutionize the making of boards for cigar boxes, backs of pictures, butter boxes and the like. At the time of the test, ash, cherry, birch and basswood logs were cut.

The boards dropped from the blade as smooth as if rubbed with sandpaper. One of the witnesses of the trial, Mr. Albert Lewis of the Wilksbarre Lumber Co., one of the largest lumber concerns in Pennsylvania, said it was the most perfect thing he ever saw. With our saws, he continued, we cannot cut dry lumber at all, while this machine cuts anything. Neither could our saws cut a board one-thirty-second of an inch in thickness, as this will. But the best thing it will accomplish will be the tremendous saving in the wood itself.

The Bevington Welding Process.

This new mode of welding, without the use of fluxes of any kind, and in which no heat from fire is used, is entirely novel in character, and is attracting much attention from iron workers from its simplicity, its effectiveness and the speedy manner in which the work is done. The heat employed is simply frictional heat, and is produced by pressure and friction between the surfaces to be joined, as they pass through the machinery employed in doing the work.

As an evidence of its novelty and great value, we need only refer to the fact that the Committee on Science and Arts of the Philadelphia Franklin Institute has recently recommended that the Elliot Cresson medal be awarded to the inventor of the process.

This invention is described by that Committee as follows: "The invention consists in forcing strips, rods or tubes of ductile metal into converging revolving dies of harder metal, in which it becomes heated and compacted and acquires the shape of the interior of the die. The machine adapted to carry out this process is substantially a lathe, with hollow arbors in both headstock and tailstock. The hollow spindle of the tailstock is screw-threaded, and is mounted in a threaded-bearing, so that it can be set in and out, for which purpose it is provided with a hand wheel. A contractile clamp is set in the inner end of this arbor, which is adapted to hold the rod or wire from turning as well as moving lengthwise. Two wires to be welded are preferably prepared by scaring or by cutting the ends upon an incline, so as to give each a corresponding bevel. One of the wires is thrust through the hollow shaft, and part way through the die, and the wire is fastened in this position by means of the clamp at the rear of the headstock. The other wire is inserted in the tubular spindle of the tailstock and passed out through the clamp a little way, and is then firmly secured in place by means of this clamp. The arbor of the tailstock is then fed inward until the beveled end of the wire is forced into the die and brought firmly against the bevel of the other wire. The die is then very rapidly revolved, while of course the two wires are held in a fixed position and forced together. During this rapid movement of the die, a very high degree of heat is developed by frictional contact, which is of sufficient intensity to heat the two ends of the wire to a welding heat and perfectly weld them together along their contact faces."

It will be somewhat difficult for any person, even a well versed mechanic, to form a very adequate idea of the machinery employed in the process by any description that can be made of it without a full illustration of the same, which we hope to be able to give at an early day in the future.

Until we are able to present such an illustration, we will only say that it may be applied to the welding of wires or round iron rods, after the ends to be welded have been properly scarfed so as to be brought together, without materially increasing the diameter of the rods at the point of junction.

Hollow tubes or piping, either iron or copper, for gas or water use may be formed and perfectly welded from flat strips of iron. The iron strips are simply wound upon a reel, the laps overlying each other, the free end of the strip brought in contact with the machine, which, when in motion, draws the strip from the reel, and by automatic movements gradually shapes the iron into proper form and delivers it at the opposite extremity a firmly welded tube, so neatly and perfectly done that the place of the weld is scarcely perceptible. The welding seam may be made either straight from end to end or it may be made to pass around the tube in spiral form, which latter, of course, greatly adds to the strength of the weld. Of course, the tubes or pipes can be made of any desirable lengths.

The capacity and utility of this invention is pronounced by the Committee of the Franklin Institute, above referred to, as almost unlimited when circular forms of ductile metal are required. It has already been applied, commercially, with most satisfactory results, to cartridge cans for dynamite projectiles and seems to develop the fullest

strength of the material employed. The committee concludes its report with the statement that the invention is entirely novel, is simple and easily managed and economical in use, and does not require a very costly plant. It is undoubtedly one of the most novel and useful inventions of the day.

A Successful Cotton Picker.

Several machines have been devised and put into more or less extensive practice to supplant the slow process of picking cotton by hand, but until in the one below described we have never met with one which seems to have received the full confidence of any extensive cotton grower. We infer however from what appears below, that success has now been reached in a recent invention by Mr. Angus Campbell, a native of Ontario county, Canada, but for the last 12 years a resident of Chicago, which is pronounced nearly, if not quite fully equal in value and importance for picking cotton to the invention of Whitney's cotton gin for clearing that product of its seeds. It is described as a marvelous triumph of mechanical skill in accomplishing, by rapid machine work, the slow and expensive handwork now employed in picking cotton. Several inventions for accomplishing that work have heretofore been made, some of which have met with encouraging success, but Campbell's machine is said to be a complete triumph. Picking cotton is a very complicated work for a machine, from the fact that choice and judgment must necessarily enter largely into the work.

The cotton plant is loaded at the same time with ripe cotton, unripened bolls and blossoms. No machine can be a success unless it will pick what is ripe and *all* that is ripe, and leave uninjured the unripened bolls and blossoms to develop for a later picking. This Mr. Campbell's invention will do, and a hundred Southern newspapers have proclaimed the fact that their representatives have witnessed its successful performances in the cotton fields near Waco, Texas. The Southern planters were at first too incredulous to give it serious consideration, but after they have witnessed its operations they have become very enthusiastic, as they know that it costs more than \$100,000,000 to pick the cotton of this country. By the use of this machine, it is confidently predicted the same work can be done at a cost of not more than \$25,000,000. A saving of \$75,000,000 annually in this country alone in putting on the market one of our most needed products, and one which does or should enter largely into the daily wear of every human being on earth, is a matter of inestimable importance, and it will add still another bright laurel to the genius of American invention. Mr. Campbell may now take rank with the great inventors of the world, and it goes without saying that both himself and his associates, who are engaged with him in putting this invention before the world, will reap enormous profits. A company, with a capital of \$5,000,000, has been organized to build factories and enter upon the manufacture of the machines, for which there must soon be an enormous demand.

SCIENTIFIC PROGRESS.

Superior Coal from Common Lignite

Mr. Albert Edelmann, a native of Poland, a graduate of the University of Dorpat, and a civil engineer who has exercised his profession for many years in Europe and Australia, and who subsequently found his way to Washington, D. C., claims to have discovered a cheap method of converting our cheap lignites into a coal as valuable as our best bituminous or anthracite coals. It is generally admitted that our bituminous and anthracite coals have been changed from their original character, as lignites, by the slow processes of nature, which have occupied many thousands of years, into the improved conditions in which we now find them. Mr. Edelmann claims to have discovered a rapid and cheap process by which these lignites may be thus artificially changed by a rapid chemical process, which will add but very little to the original cost of the lignites.

Mr. Edelmann claims to have devoted some twenty years of study in perfecting his invention, and now feels satisfied that he can cheaply and rapidly convert the almost worthless lignites into the most valuable of mineral coals. This process, he claims, is simply a chemical one, fully as effective in the changes produced as are the slow processes of nature. In describing his process the inventor says: "To accomplish this result the lignite and certain chemical bodies (which have first been reduced to a powdered condition in order to permit of their perfect commingling) are

placed in molds and subjected to great pressure by machinery, and from which the mass comes in the shape of what are termed, for want of a better name, 'briquets.' These briquets can be made of any size or shape, in order that they may suit different conditions, as, for instance, if the material is to be used for furnaces they would be in the neighborhood of eight inches in size (either square or oblong) whereas for stoves they would be made correspondingly smaller. A great advantage about having them made into this shape, square or oblong, is that they will not chip off or become broken in any manner like ordinary coal; in fact, the immense pressure exerted in forming them tends to make them even harder than ordinary lump coal.

"A desideratum about lignite is that it is found near the surface of the earth, and consequently the cost of mining it is reduced, and at the same time the supply is practically inexhaustible. The chemical bodies used are also comparatively inexpensive, so that this coal (for this composition is coal in every sense of the word) can be manufactured more cheaply than either bituminous or anthracite coal can be produced.

This new aspirant for fame and fortune seems to at least have the courage of his convictions, for he is freely spending his own money to prove the results of his discovery. The *New York Herald*, from which we gather these particulars, says his claims are entitled to respect and confidence, from the fact that the Patent Department at Washington stands ready to issue to him his patent papers as soon as he has made the necessary arrangements for foreign patents, for which purpose he has just left for Europe.

Lignite which comprises the chief portion of his artificial coal is abundant in almost all parts of the world, is generally near the surface, is cheaply mined, and is of but little value. The inventor claims to have already purchased a large tract of lignite land in Texas, which abounds in this cheap and almost worthless coal. According to the *Herald*, Mr. Edelmann has received a large offer for his invention or an interest therein, from a corporation which agrees to take 300,000 tons of coal a year, as soon as it can be delivered. Improbable as the discovery appears to be, it seems to be vouched for by the Patent Department at Washington, which never lends itself to any mere chimerical scheme which partakes in any way of the nature of a fake or swindle.

TO PREVENT ACCIDENTS FROM EXPLOSIVE GASES IN COAL MINES.—A recent English invention is a water cartridge, some very interesting experiments with which were recently tried in an English mine. An explosive charge of tonite is placed in a tin tube of a size suitable for a shot-hole. The tube is filled with water, and the cartridge is suspended in it by means of a wire connection with the detonator. The tube is securely plugged, the cartridge placed in the shot hole and rammed in the usual way. The advantage claimed is that when the charge is exploded there is no flame, and consequently no danger of igniting gas, while at the same time the coal is not shattered as in ordinary blasting. At tests made with the cartridge, four ordinary shots were fired in the coal with four-ounce charges of tonite without any flame being observed. In a severe test, two blow-out shots were tried in hard metal, with no indication of flame, while as a final test a loaded cartridge was fired on the mine floor, and again there was no indication of flame. These tests were regarded by the mining experts present as conclusive as to the absolutely flameless properties of the cartridge.

NEW FORM OF LIGHT.—An improved industrial light, it is said, has been devised for burning any of the common heavy oils. A tank containing the oil has been constructed, inside of it, a small steam boiler with steam gauge and safety valve, and giving a steam pressure of from 25 to 50 pounds per square inch. By a suitable arrangement of taps the steam is made to convert the oil into a spray, in which form it is burned, giving a brilliant light. By this means there is no spluttering or unconsumed oil, and the burner requires no cleaning. The use of steam obviates the necessity of the periodical pumping of air that is necessary in many forms of these lights to give the required pressure to consume the oil.

THE LIGHT FROM AN ARC LAMP.—It is said that the great light from an arc lamp comes from the crater in one of the carbons. Hence recent search lights are arranged so that the light of the crater is thrown on the reflectors, and not the flame light, as that is purple and of feeble quality.

ENGINEERING NOTES.

The North River Bridges.

The formal breaking of ground for the great North River bridge has just taken place and is regarded by those directly concerned as an event of importance comparing well with the laying of the Atlantic cable or the building of the Canadian Pacific railroad.

About the same time as above, on Dec. 24th, the New York and New Jersey Bridge Company also went through the ceremony of turning the first sod for its proposed structure.

Although Congress has not as yet granted authority for either of the above named companies to span the North river at the points indicated, both connecting New York City with the New Jersey shore, still both companies appear to be taking active steps to commence the real work of bridging that river.

Chief Engineer Clarke, of the last mentioned Co., in answer to the question whether he thought the bridge would pay if built, said: "If every passenger over the Pennsylvania road had a trunk and would pay 40 cents for its transportation over the bridge, that alone would give the bridge a fair profit on the investment."

There is but little doubt but that a concession will be granted by Congress for both of these bridges, and that both will be built and prove profitable speculations; and, in addition, the tunnel will also pay if it should ever be completed, which it probably will be even before a passenger is able to cross either of the bridges.

Strange to say, and true it is, that the chief opposition to the building of these bridges comes from the New York and New Haven Railway and the Union Ferry Company. Of course, such a fractious and unpatriotic opposition will go for naught when the real struggle comes on in Congress.

THE IMPORTANCE OF THESE GREAT WORKS.

Andrew H. Green, in his address delivered on the occasion of breaking ground for the North River bridge, said: "The illusion that the prosperity of New York depends principally upon her foreign trade is being dissipated, and while we would, by all proper means, augment our commerce with other countries, we must no longer delay facilities demanded for our own. The greatness and prosperity of cities are not dependent upon foreign commerce. The historic cities of Asia and Egypt were interior cities. Paris, Berlin, Moscow, Vienna, Madrid and Cairo are interior cities, and there are, as well, many of our own thriving Western cities that live chiefly upon the traffic that comes from their own vicinage. A view of the commercial development along our Atlantic Coast shows that cities that have the best approaches by land routes are necessarily the ones that have greatest growth and prosperity, and not those primarily provided with the best sea approaches and harbors. It is evident that bridge communications between New York and New Jersey, and her neighboring territory, have been too long delayed. The disadvantages heretofore attending this condition can now be obviated by the marvelous triumphs of modern engineering. From her position, New York is the *entrepot* and thoroughfare of the great regions to the north, east and west, and all that is needed to perfect the bounty of her opportunities is the consummation of the work now inaugurated."

The Nicaragua Canal.

The completion of the Nicaragua canal, says the *Chicago Tribune*, is one of the most important questions which will occupy the attention of the fifty-second Congress. Its necessity as an auxiliary to our naval power and the defenses of our coasts has been fully recognized by the Secretary of the Navy in his report.

The President in his annual message recognizes the canal as "the most important subject now connected with the commercial growth and progress of the United States," and makes the following direct and practicable appeal to Congress:

If this work is to be promoted by the usual financial methods, without the aid of this Government, the expenditures, in its interest-bearing securities and stock, will probably be twice the actual cost. This will necessitate higher tolls and constitute a heavy and altogether needless burden upon our commerce and that of the world. Every dollar of the bonds and stock of the company should represent a dollar expended in the legitimate and economical prosecution of the work. This is only possible by giving to the bonds the guarantee of the

United States Government. Such a guarantee would secure the ready sale at par of a three per cent bond from time to time, as the money was needed.

It is to be hoped Congress will take some definite action at this session toward the construction of the canal. The strategic value alone of the canal in the event of war is sufficient to warrant the Government in endorsing the work and giving it financial backing.

SOME MONSTER DAMS.—It is to be hoped that the gigantic dams which are being erected in the West for irrigating purposes are being constructed solidly enough to insure the safety of the people living in the valleys below them. Persons who have never seen an irrigating dam have but a slight conception of their immensity. The following are the dimensions of four of the largest that have been completed within the last year: First—The Walnut Grove dam, near Prescott, A. T., 110 feet high, inclosing 750 acres, with a capacity of 4,000,000,000 gallons. Second—The Merced dam, Central California, one mile long, 60 feet high, 650 acres, capacity 5,500,000,000 gallons. Third—Sweetwater river dam, near San Diego, California, 90 feet high, 725 acres, capacity, 6,000,000,000 gallons. Fourth—The Bear Valley dam, in San Bernardino county, California, is 60 feet high, inclosing 2,250 acres, and will hold 10,000,000,000 gallons of water.—St. Louis Republic.

The last mentioned dam impounds the largest artificial body of water in this country, and perhaps in the world, and is soon to be enlarged to more than double its present amount, by a new and higher dam just below the present one.—Ed.]

ELECTRICITY.

Electrical Railroads.

The electric road is still in its infancy, but it is being rapidly adapted for both transportation and freight. As yet it is confined exclusively to short distances; but the success attending these experimental roads is most encouraging for an enlarged and vigorous future. Here in California we already have a number of electric roads of considerable length either in actual progress of construction or in an advanced state of preparation therefor. The Oakland and San Jose road which will convey both passengers and freight, is making good headway in construction. The road upon the west side of the bay, from this city to Half Moon Bay, will be the pioneer in this class of construction and will prove a great boon to farmers and others who live along the lines of travel. The time is not far distant when the people of this city will be able to make the entire trip from San Francisco to San Jose on one side of the bay and return by the other, a distance of about 100 miles through one of the finest agricultural sections of the State.

Soon after, and perhaps before these roads are completed, we shall have another reaching from tide water at or near Vallejo far up into Napa and other minor valleys tributary to the point mentioned. Producers along all these lines of travel will then be able to ship their products to this city at a much less cost than now.

The time will also soon come when similar facilities will be within the reach of the farmers in all our great valleys from the northern Sacramento to the extreme of the southern San Joaquin, with branches at short intervals and in every direction into the foothills. When this is reached, both passengers and traffic will be relieved from the short-haul exactions of our existing continental roads.

Electric roads can be built and operated for much less money than is required for steam motor roads, and when they are confined to the valley lands alone, the people who support them will be relieved of the extra tax now levied upon them to support the more expensive portions of the longer roads which extend far into and over the mountains. The electric road will, in the near future, become eventually the farmers' and the people's roads. They will be owned and operated by the people and for the people.

California can make no mistake in building electric roads. The time is fully ripe for energetic movements in this direction. The future of the commercial and farming interests of California lies in electric roads for local traffic and the ocean route via the Straits of Magellan or Nicaragua canal for the greater part of our bulky products. Our overland roads will be supported mainly by

passenger traffic and fast freight trains for the transportation of costly goods and perishable fruits. By the time the new means of traffic and transportation are completed our rapidly multiplying products and travel will give full employment to both our existing and future means of transit.

Steam and Electricity on the Farm.

It goes without saying that great improvements have been made, during the last few years, in agricultural work, not only in the introduction of machinery for doing the work heretofore accomplished by hand, but also in many cases by the substitution of steam for horse power. The introduction of machinery made it possible to transfer a large portion of the hand work on the farm to animal power. When the reaper took the place of the old time cradle, and the flail gave way to the thrasher, it became possible to introduce the horse more generally into farm work. The substitution of the steel plow for the rude wooden and wrought iron implements that had been used from the dawn of civilization, was another step in advance; but all this soon became crude and unsatisfactory—a mere "cruelty to animals" compared with the later introduction of steam upon the farm.

On the great plains of our Western States and throughout the vast level valleys of California, it was soon found practical to substitute steam for the horse in reaping, mowing, thrashing and plowing. Our inventors and engineers found a way to disconnect the horse and substitute tireless steam motors for weak and costly animal power. The application of steam to the reaper, the thrasher and the plow was a wonderful advance in agriculture, and placed that industry in the same line with manufactures and commerce. As a result of these improvements, the great Western States and California have developed agricultural productions to an extent which many centuries could not have reached by the old methods, and have moreover vastly reduced the cost of the most important necessities of life.

In addition to what steam has done on the farm, it has also done away with the slow-moving caravans, by which animal power was compelled to distribute the products of the farm to the various classes of consumers whose occupations made it necessary that they should be domiciled at distances of greater or less extent from the sources of their food and other supplies. The application of steam to the locomotive, hauling carriages on iron rails, has in these latter days made transportation so cheap that we can now transport our farm products across continents and over oceans as cheap as the old time ox and horse team could haul them to a near-by town for consumption.

BUT WE HAVE NOT YET REACHED THE END.

Inventors have sought through earth and air, and are constantly seeking for still further means to simplify and cheapen productions—on the farm, in the manufactory, and transportation by land and water. The steam engine has been improved and pushed about to its limit. It has proven itself a most obedient giant in doing the will of man. It has revolutionized every industry and every pathway, but with the irrepressible genius and forward thought of man, he must still progress—he must find other worlds to conquer. In this work of progress he has risen above both earth and water and is seeking to wrest further secrets from nature. He has grasped and is seeking to harness for his use the most subtle, the most energetic and the most obscure power which it has thus far been possible for him to reach—electricity. His success thus far in this new enterprise has been wonderful, indeed far beyond, considering the time which has elapsed, any undertaking which he has hitherto attempted. As yet he has not discovered its source, or rather the way to develop its power direct from its source. He can only use stratagem, or another power, to develop the new power he seeks. He impounds water and develops power which is useless where developed, but he calls to his aid electricity as a most convenient and economical means to convey it where it is wanted. He sometimes uses steam for the same purpose—both are costly and a roundabout way is the only method he yet has for reaching the ultimate.

He knows that heat, light and electricity are one and the same and interconvertible, the one into the other. They are also as universal and as free for use as the air we breathe. He is now endeavoring to seek a cheap and ready method for converting cheap and powerless heat into the active en-

ergy of electricity. He has, in all probability, reached the very verge of the great secret. Seemingly, when that end is accomplished, he will have found the true philosopher's stone, and there will be no more world's to conquer.

No one will profit more than the farmer by such a discovery. The true electric motor, when attained, will be the most obedient, the most flexible, the simplest motor, imaginable. It will have few wearing parts, all of which can be protected from dust and dirt. It will have ample power, little weight, and will need but a mere modicum of the fuel required to feed an engine.

It will greatly lighten labor, both human and animal; it will increase production, decrease the cost thereof and cheapen food for both man and animals. The whip will be no longer needed; the use of coal will be reduced to a mere moiety, and agriculture will be still further raised in dignity and usefulness. Let us hopefully desire and earnestly work for such a grand and desirable result.

In the meantime we must depend upon water and steam for our present purpose, and use the coming power merely as a carrier. As such it will soon find its use upon the farm to drive the harvester, the thrasher and the plow, and transport our products from the farm to the consumer.

GOOD HEALTH.

Can Cancer Be Cured?

Let Sufferers See for Themselves and Act Accordingly.

Under the above head, the *Morning Call* of this city gives the following, which is a full endorsement of what has been repeatedly set forth in the columns of the PRESS:

"The medical profession the world over has always maintained that cancer was a malady which was absolutely incurable. Caustics, deadly drugs and the cauterizing iron have been administered to the tortured patient until he has succumbed, if not to the disease itself, to the excess of experimental practice, which has exhausted the vital forces; and now comes the startling announcement that not only is cancer eradicable "without the use of either plaster or knife, or any other treatment which entails pain or suffering," but that the discoverer of the remedy is a woman, Mrs. Dr. C. A. Cook, of 224 Post street, who, under the auspices of the 'King's Daughters,' an active and benevolent association which has a world-wide celebrity, has been placed in possession of the building owned by the city, and formerly occupied by 'The Old People's Home.' Five patients (since increased to eight and more coming) are now occupying separate, cosy rooms, and all are said to be doing well, with every prospect of an early and complete cure. Those afflicted will not have to go abroad to investigate methods, and ascertain from those under treatment the measure of success, for Dr. Cook's success or failure can be verified right here. Let such as are suffering see for themselves, draw their own conclusions and be governed accordingly."

Why will not our physicians, and suffering patients as well, heed the advice of the *Call* given in the concluding lines of the above paragraph? By so doing hundreds of lives might be saved in this city alone, to say nothing of other localities. Where are our city and State Boards of Health, who are paid for looking after the health of the citizens of this State and city, that they do not enquire into this matter and see whether it is true or not? If the claim set up that we have a painless specific for cancer in this city, and that the knife and caustics and cauterizing iron, in view of this fact, are simply useless and barbarous, is false, why do not our health officers look into the same and authoritatively pronounce the claim a swindle and the practitioner a humbug and a criminal for obtaining money under false pretenses? Is it not their duty to do it? If we have been so fortunate as to secure, in our present, as good a Grand Jury as the one just pronounced illegal, it is to be hoped a proper inquiry will be made into the matter by that body. Such an inquiry is more important than even that of the doings of "political boodlers"—as much more important as human life is worth more than dollars and cents.

HEALTHFUL AND PLEASANT.—If you want a lovely odor in your rooms, says the *Scientific American*, break off branches of the Norway spruce, and arrange them in a large jug well-filled with water. In a few days, tender, pale green branches feather out, soft and cool to the touch and giving a delightful and health-giving odor.

MINING SCIENTIFIC PRESS.

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W. B. EWER, SENIOR EDITOR

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Our latest forms go to press on Thursday evening.

SAN FRANCISCO:

Saturday, January 23, 1892.

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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE]

Mining Machinery—Union Iron Works.
Vapor Engines—California Vapor Engine Co.
Gas Engines—Hirsch & Schilling.
The Engineering and Mining Journal—The Scientific Publishing Co., New York.

See Advertising Columns.

Passing Events.

The interest of the mining community of this State is this week centered in the Mining Convention in session in this city. A large and representative body of men has met to consider the questions relating to the business of mining with a view to its improvement in various ways. As far as the proceedings have gone to the present writing, everything has been harmonious. The representatives from the valley counties have been accorded a hearing and express themselves as generally satisfied that the miners desire to ask for nothing which will injure other interests. As long as that feeling prevails, the contending factions can be brought together in harmonious action, which should result in mutual benefit. The resolutions and memorial adopted by the Convention are conservative, and cover the ground very fully. The discussion on past troubles and effects has been avoided, and the attention turned almost entirely in the direction of remedial measures.

FALL OF A METEORITE.—A small meteoric fragment is said to have passed through the window of a house at Carson, Nevada, on the 4th instant. It fell from a cloudless sky about 4 o'clock P. M. It weighs less than an ounce and is pronounced a genuine meteorite. It will be sent to the Smithsonian Institute at Washington.

The State Mining Convention.

On Wednesday at 2 o'clock the State Mining Convention assembled in Pioneer Hall. J. H. Neff of Placer county, chairman of the Placer County Miners' Association which issued the call for the State Convention, was elected temporary chairman on nomination of Judge Walling of Sacramento, seconded by Mr. Johnson of Sacramento.

Mr. Neff was elected, and upon taking the chair addressed the Convention as follows:

Gentlemen, I thank you. I shall endeavor as a temporary officer to so conduct the affairs of the Convention as to be considered impartial and fair, and particularly so to our friends who come here from a distance, representing districts that are not strictly mining counties. I wish to admonish you, my friends, to be particular regarding the resolutions you shall formulate here. We cannot afford to antagonize the farming interests of this State. There are two great contending interests in California that we want to harmonize and to weld into the bond of a fraternal union.

This Convention was not called for the purpose of nullifying any law or overriding any decision of the courts, for we consider ourselves law-abiding citizens. To our neighbors in the valleys we will say that we don't propose to cover you up with slickens. I have never in all my experience of 40 years in California seen a better representative body of citizens than that which I now see before me, and I do not think that we will disagree.

D. T. Cole of Sierra proposed W. C. Ralston of San Francisco as temporary secretary. Mr. Ralston received the unanimous vote of the meeting. E. A. Wiltzell of Nevada and Thomas B. Everett of Placer were appointed assistant secretaries.

After some discussion as to the number to be appointed on the committees, Mr. V. S. McClatchy of the Sacramento Bee, and a member of the Sacramento delegation, came before the convention and made a short but effective speech, as follows:

Mr. President and Gentlemen of the Convention: This is an honor which I had hardly expected to be called to the platform. I desire to say to this convention simply this, and it is something which yesterday I had no idea of saying. It occurred to me this morning that it ought to be said, from hearing various comments that had been made upon the appearance of the Sacramento delegates. I believe that the motives of these gentlemen in coming here were misunderstood. I, as one of the publishers of the Sacramento Bee, regarded as the most rabid anti-hydraulic in the State of California, can say with good grace to you, gentlemen, what I am about to say.

They have fought a good fight—the farmers and miners—because it was fought earnestly on both sides, and there is no good reason why good fighters should not be good fellows. That war is over. He is not a good patriot who continues a war after peace has been proclaimed. Both sides fought for what they deemed to be their rights—the valley man for the protection of his orchards, his goods and his improvements. You gentlemen have a right to conduct the business upon which you depend for a livelihood and which you believe to be right and proper.

This question has been submitted to the courts, and the courts have decided on the particular principle that any man can use his own so long as he does not injure the property of others. Now, gentlemen, we find from the almost unanimous expression on the part of the gentlemen engaged in hydraulic mining—and I want to say here that the valley people never had any objection to any other kind of mining save hydraulic mining—that they will not oppose the laws of the State and nation, and that they will not oppose the decrees of the courts, and we came down to say to you that we want to bridge the chasm. [Applause.]

Now we of the valley oppose mining only so far as it threatens to destroy our homes. Now that has passed away and we believe you will not do anything to injure us, we will extend to you the right hand of fellowship.

The Sacramento delegation came down here to help you to solve this problem of how not to injure the rivers or our homes, and in any means that will accomplish that object we are with you. We know that the people of the State of California, ourselves included, are as much interested in the prosperity of a great industry like mining as we are in the numerous other industries which we now foster. We want to foster mining, and we came here to say that there is only one California, the greatest country on God's footstool, and we wish to foster every industry that will tend to develop its great resources. [Applause.]

Gentlemen, I thank you for your attention, and I want to assure you with all modesty that we people in the valley, the rabid anti-hydraulic, only ask for what is fair, and will support you in any proposition that will not endanger our homes.

Mr. McClatchy's speech was received with great applause and furnished the keynote to the harmonious proceedings subsequently carried on. Judge Bell, of Shasta, said:

I wish to say on the part of the mining men of the State that we, too, will extend the hand

of fellowship to Mr. McClatchy and to those who represent the same interest as he. The mining men have no fight against any interest that is for the peace and welfare of this State.

The Secretary read telegrams from Senator Felton and Governor Markham, the former expressing his sympathy with the convention and the latter his regrets at not being able to be present.

G. H. Wheaton, M. P. Jones and E. T. Allen, a committee from the San Francisco Board of Trade, and A. J. Ralston, Robert Watt and G. W. McNear, a committee from the Chamber of Commerce, were announced and admitted to the convention.

J. K. Luttrell of Sonoma made a short speech and was followed by J. T. Devlin of Sacramento as follows:

"There are no people who would more gladly see the hamlets and villages of the mining regions of California filled with a happy and prosperous population than the people of Sacramento. They would be pleased to do anything to secure that result if it could be accomplished without injury to them. If the gentleman means that Congress shall be asked to provide a way by which engineering skill may be brought to bear successfully upon this work, we of Sacramento will approve of it. As I understand the sentiment of the mining delegates here from conversations which I have had with some of them, they recognize the decisions of the courts and the law that has been declared and determined and as law-abiding citizens, they desire to act within that law, and ask Congress to make appropriations to carry on the surveys and reports of the engineers, the work to be done without injury to the lowlands or to the Sacramento and the other rivers.

"In order, then, that there may be no misunderstanding, in order that our delegation may act in unison with you, let it be understood that the report will not be to overrule the decision of the court, but to secure the necessary appropriations in order that mining may not be resumed to the injury of the agricultural interests of the State."

Mr. Luttrell replied that the object was not to interfere with the courts—it was simply to ask Congress to pass laws making such appropriations as will enable the resumption of hydraulic mining, provided that it does not destroy the interests of the farmer.

A recess of an hour was taken then, and on reassembling at 5 o'clock, Chairman Neff announced the following committees:

Resolutions—C. W. Cross, Chas. G. Yale, San Francisco; J. B. Hobson, Placer; G. J. Carpenter, El Dorado; J. M. Walling, Nevada; F. M. Swasey, Shasta; Grove L. Johnson, Sacramento.

Permanent Organization—T. L. Ford, Sierra; L. S. Barnes, Shasta; D. K. Perkins, Butte; Edward Coleman, Nevada; S. K. Thornton, San Francisco; H. K. McCusick, Alameda; E. C. Voorheis, Amador.

Credentials—J. S. McBride, Nevada; Robert Howe, Sonoma; F. R. Wehe, Sierra; Thomas Fraser, El Dorado; M. M. Drew, Sacramento; A. B. Paul, Shasta; James O'Brien, Yuba; T. J. Nichols, Placer; James Tunstead, Marin; A. Walrath, San Francisco; H. V. Reardon, Butte; H. G. Blaisdell, Alameda; C. McTarnahan, Tuolumne; E. W. Jones, Colusa; H. R. Givens, Trinity.

Memorial—Chas. G. Yale, San Francisco; J. K. Luttrell, Sonoma; R. C. Downs, Amador; H. A. McCraney, Lake; G. W. Cox, Sierra; Myron Angell, San Luis Obispo; Frank McLaughlin, Butte; Patrick Reddy, Inyo; J. P. Haynes, Humboldt; W. W. Kellogg, Plumas; J. S. Cone, Tehama; James Nelson, Yuba; W. D. English, Alameda; I. H. Reed, Calaveras; A. B. Dibble, Nevada; J. M. Fulweiler, Placer; John H. Shine, Tuolumne; John McMurray, Trinity; J. J. Crawford, El Dorado; J. H. Lawrence, Merced; N. Coombs, Napa; Aaron Bell, Shasta; F. H. Hall, Siskiyou; R. T. Devlin, Sacramento; R. M. Folger, Mono.

In the evening the committees held three sessions and prepared their reports for the Convention.

It was found that Pioneer Hall was too small to accommodate the delegates and public, and on Thursday the Convention assembled at Metropolitan Hall, the body of which was completely filled. The gallery also held a large audience.

Owing to the hour at which it is necessary for us to go to press it is impossible to give any detailed account of the proceedings on Thursday. The resolutions were adopted as presented. The report of the Committee on Memorial was amended in some particulars and finally adopted. The memorial is as follows:

To the Honorable the Senate and the House of Representatives, in Congress Assembled: Your memorialists, representing the people of the State of California, in convention assembled at San Francisco for the purpose of considering the question of hydraulic mining and the improvement of the waterways of the State, respectfully represent:

That for many years there has been a conflict between the farming and hydraulic mining interests of California by reason of the debris from said mines injuring the navigable rivers and lands bordering thereon. By decisions of the federal courts injunctions were

issued against these mines and they were closed down, throwing many persons out of employment and causing great loss of capital invested in mines, ditches, etc., and a great industry paralyzed. The legislature of the State of California, realizing that a rehabilitation of this mining industry would benefit the people of the whole State and nation if it could be accomplished by joint resolution, brought the matter to the attention of Congress.

In accordance with this resolution, Congress passed an Act appointing a commission of engineers for the purpose of ascertaining if some plan could be devised to adjust the conflict between the mining and farming sections and the mining industry rehabilitated, and for examining the navigable rivers and their tributaries with a view to improvement and rectification of the rivers.

That, whereas, this Board of Engineer Officers constituted, under the provisions of this Act of Congress entitled "An Act for the investigation of the mining debris question in the State of California," approved Oct. 1, 1883, have made an examination and investigation of the mining debris question in the State of California for the purpose of ascertaining whether some plan could be devised whereby the present conflict between the mining and farming sections might be adjusted and the mining industry rehabilitated, and have made an examination of the injured navigable river channels, and their tributaries and lands adjacent thereto, with a view to the improvement and rectification of said rivers;

That it appears from said report that there are many hundreds of millions of dollars of gold in the auriferous gravel deposits of California which can be extracted by the hydraulic process, filling the arteries of commerce and stimulating to increased energy all the industries of this State and of the nation, and that wise statesmanship demands that this vast amount of gold should be added to the wealth of the country, if it can be done without material injury to the navigable rivers of the State and the adjacent lands;

That it appears by said report that dams and other restraining works may be erected in many of the canyons, which will not only restrain the material producing the damage complained of in the past, but will also restrain the debris now dislodged, but still remaining in the canyons.

We respectfully ask that your honorable body accept and adopt the report of the commission appointed by you for the purpose stated, and that Congress at once take steps to put into practical and effective operation the means suggested by the engineers in order that mining may be again resumed in the manner indicated without the injury complained of in the past.

Your memorialists further suggest that Congress, having appointed this commission to determine the question, should accept and act upon its conclusions, which are of a nature to be acceptable to both parties to the controversy, in that they provide that mining can be again carried on under the conditions named, and also that the debris will be restrained from the rivers and farming lands.

It is proper to represent also, that at four different sessions of the legislature of the State of California resolutions have been adopted calling the attention of Congress to this hydraulic mining question in California. At the last session the Governor, in his inaugural address, brought the matter again to the attention of the representatives of the people, and the legislature on December 29, 1891, again passed resolutions which were forwarded to Congress, setting forth the facts and asking for relief.

We recognize the fact that until Congress takes proper action for the erection of suitable works for the restraining of mining debris, hydraulic mining is absolutely restrained by the courts, and as law-abiding citizens, we recognize that the laws must be obeyed and the decrees of the courts respected; and inasmuch as the complete cessation of hydraulic mining until congressional action is had will be a great hardship to the mining regions and may result in their depopulation, we earnestly request you to take immediate action, in order that there may be an end of conflict and that no complaint may exist of enjoined mines refusing to obey the orders of courts.

We earnestly request you to make sufficient appropriations for the erection of dams or other restraining works in accordance with the report of said commission under such restrictions as to locality, size and extent of dams as may by law be provided for that purpose, in order that the debris resulting from hydraulic mining may be restrained as contemplated in said reports; and that said restraining dams shall be built in such rivers and streams and at such places therein as the needs of the mining industries and for the protection and preservation of farming and other interests of the State may require, as may be recommended by the Government engineers, and that all such dams shall be built and maintained at Government appropriation and expense.

That we recommend the appropriations recommended by the Government engineers for the improvement of the Sacramento, Feather and San Joaquin rivers and Petaluma creek. The commercial interests of the State of California and of the whole nation imperatively demand that these appropriations should be made.

Your memorialists above respectfully represent that the miners of the United States are dissatisfied with many of the rulings of the departments, which put unnecessary burdens upon them and prevent them from readily obtaining lands to the detriment of the mining interest. We respectfully ask that prompt Congressional action be taken upon the resolutions on the subject of the mining laws and department rulings, which were adopted at the California State Mining Convention, held in San Francisco, January 20, 1892.

Timbering in Bad Ground.

In the MINING AND SCIENTIFIC PRESS of last week a description was given of the great tunnel for the Croton aqueduct for the water supply of New York. In running this tunnel many difficulties were encountered, and the way they were overcome is of interest to the mining community, so constantly engaged in similar work. We therefore continue the subject and present

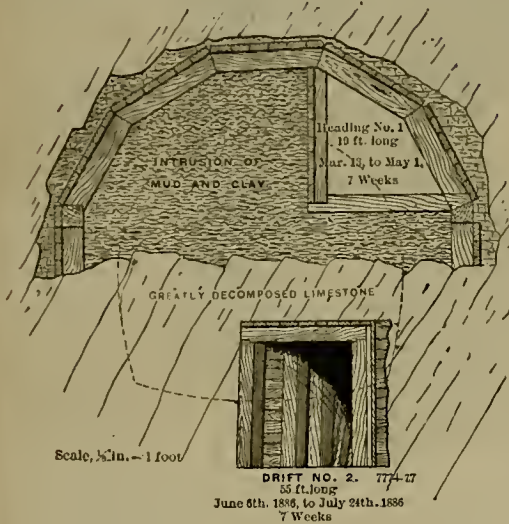


FIG. 1.—FIRST STAGE OF WORKING IN BAD GROUND.

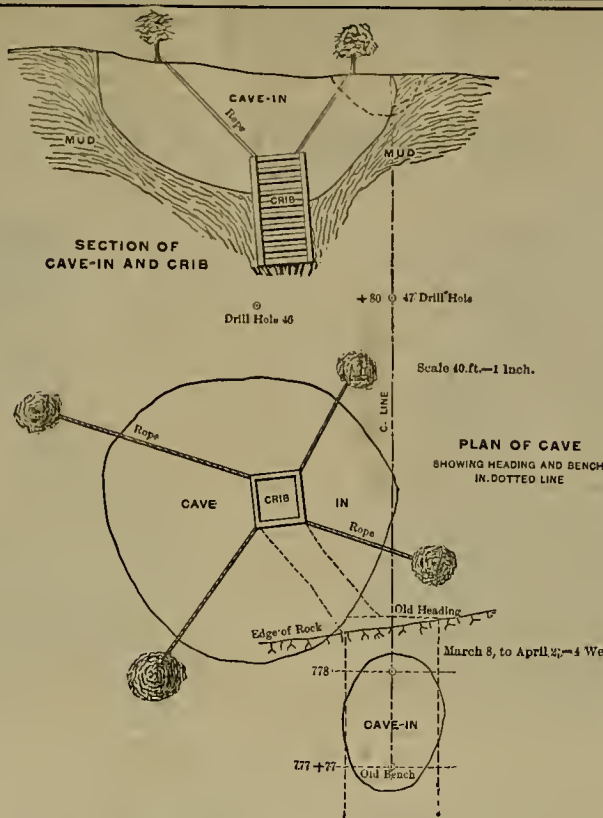


FIG. 2.—SECTION AND PLAN OF CAVE IN TUNNEL.

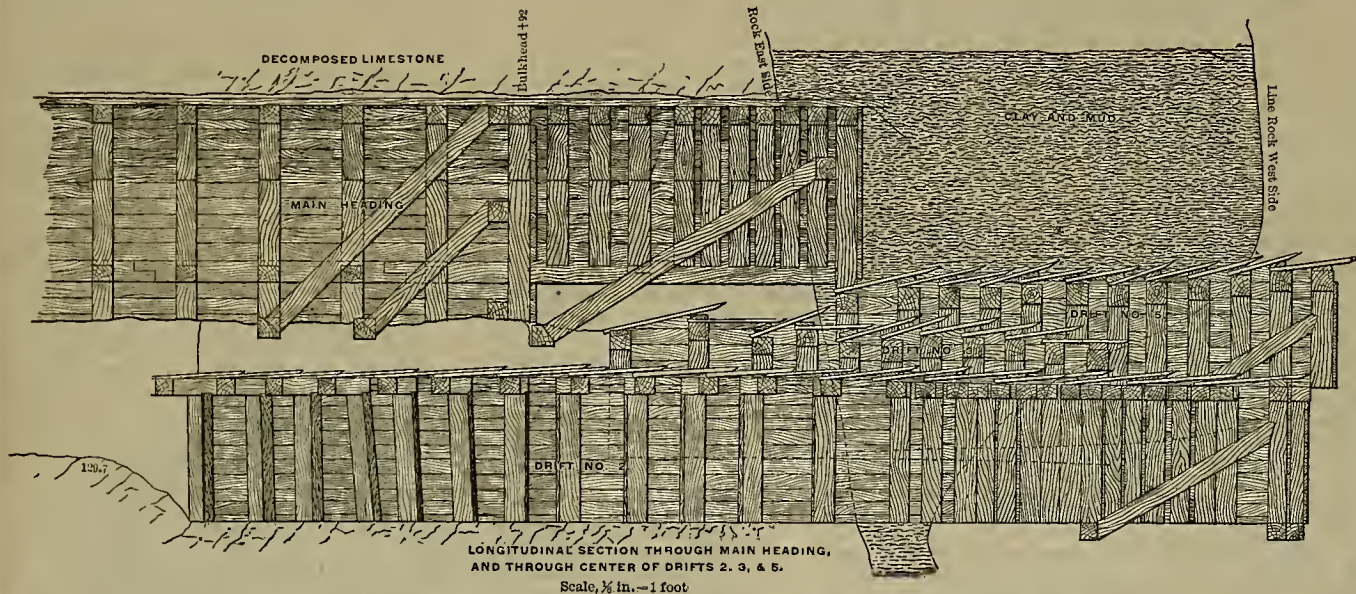


FIG. 3.—DRIFTS AND TIMBERING IN BAD GROUND. SHAFT NO. 13, SOUTH HEADING.

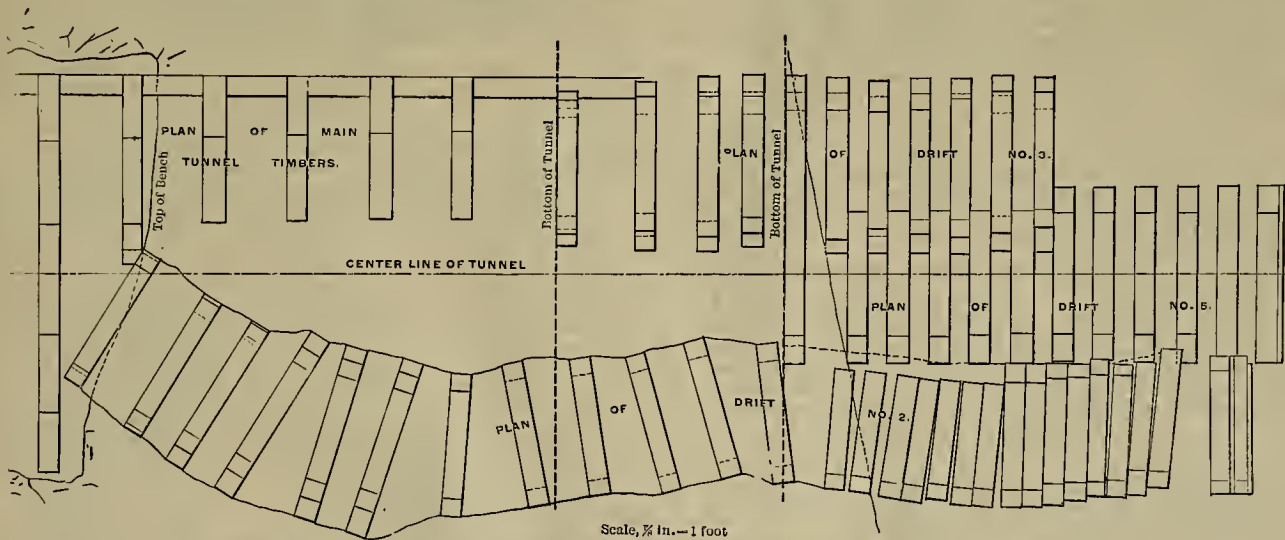


FIG. 4.—PLAN OF FIG. 3, SHOWING DRIFTS AND TIMBERING IN BAD GROUND.

first occurred. The men were driven out, and everything in the heading for 50 feet was covered out of sight.

Timbering of the form shown in Fig. 1, allowing for 20-inch brickwork, was then commenced at the soft rock. At the end of two months the heading had been cautiously advanced 34 feet and 17 sets of timber placed, the last two being reinforced with heavy hemlock spreaders. A bulkhead was then built at the ends of the timbers, this being the edge of the soft ground. The bench during this time had been brought up and was 32 feet behind.

For several days the clay and mud in the face of the heading were continually forced inward. Some idea of the pressure may be formed from the fact that the 24-inch oak logs used as rakers at the bulkhead became so crushed after 24 hours that they had to be continually renewed. A small cave on the surface then occurred. Finally, on February 20th, this was followed by a much larger one, about 25 feet east of the center line. It was directly in line of a small stream which partly filled it with water. The stream was immediately diverted, and a pump rigged to remove the water from the hole. This cave was supposed to be the mouth of the original fissure, and an abortive attempt was made to clog it up by throwing in bales of hay, cedar brush, logs and stumps. Either from the fact that the course of the brook had not been properly diverted, or by reason of a sudden thaw, or local conditions, this debris gently glided down into the tunnel, completely filling it for 70 feet, and gradually sloping down to a depth of 1.5 feet for 312 feet, or to within 75 feet of the foot of the shaft. It amounted to about 1189 cubic yards.

Faith in the theory of a fissure in the limestone led to the plan of a crib (Fig. 2). It was aimed to strike the fissure which was to be arched over or otherwise closed. The dimensions were 12x12 feet on the outside. It was built in the hole and consisted of wall plates of 12-inch timber, jointed at the ends and held apart by vertical posts 2 feet 10 inches long, placed at the corners, the whole system being held together by planks spiked on the outside. It was sunk to a depth of 50 feet, when hard pan occurring on the west side it began to sink irregularly. Sheet piling was then driven on the east side, and finally, to keep the crib from toppling over, ropes were attached to the top and bottom sets and secured to trees and posts on the surface.

After three week's work and the expenditure of about \$900, the contractors concluded that they had expended the "amount allowed for any work they should do on the surface, to be paid after the tunnel was through," and stopped.

several engravings showing the drifts and timbering in bad ground.

On June 1, 1885, the tunnel at the foot of shaft 13 was commenced and advanced 80 feet per month for 392 feet through

hard dolomitic limestone, which then became softer. Fifteen feet farther and the trouble began. There poured out a mixture of decomposed limestone, clay, sand and dirty water, which soon partially filled the

tunnel for 125 feet. After three days the water became clear, the fissure was plugged with straw, and the heading advanced 20 feet farther. Then, without warning, another outpour three times greater than the

At this time the Diamond drill was brought up and several holes sunk, from 100 to 200 feet, and the result of these borings was that work was stopped. Two years later the hole was filled up with 2533

cubic yards of earth. The contract price of \$5000 had to be paid, and to the relief of all concerned, the crib was buried out of sight.

At this time several plans were proposed. That of the division engineer in charge, Alfred Craven, was finally adopted in January, 1887. It was a timber platform of white oak pine, upon which the concrete should be laid. The horseshoe section was retained. For the next year work was carried on with a series of experimental drifts, conforming to no regular system of timbering.

The first drift started progressed 18 feet in two weeks. It was driven within the original heading on the west side. It advanced 20 feet when the sand rushed in through a 12-inch opening and filled it up for 12 feet. A bulkhead was then built across the entire heading, and the mud removed, which occupied three weeks longer (Figs. 1, 3, 4.)

The next experiment was to drive eight two-inch pipes, with perforated ends, 30 feet into the mud and sand, in order to drain it; this was not a success.

For the second drift, 40 feet with a sump was sunk 8 feet deep on the east side, and a ditch carried 4½ feet below invert-grade to the level. Here a bottom drift was started on the west side. It was five feet in the clear, and was timbered with square sets placed two to three feet apart; 19 regular sets and 10 intermediate sets were put in. It was 54 feet long, 35 feet through decomposed rock, the remaining 19 feet through heavy ground which caused the timbers to crack. Finally, mud ran in as fast as it could be excavated, so that the drift was abandoned after 11 week's work. Figs. 1, 3 and 4 show it in section elevation and plan.

The great trouble was to drain this ground. The water amounted to 160 gallons per minute. After ten months it had not sensibly diminished, and, in fact, never did diminish. There was some talk of diverting the line of the tunnel to the valley on the west, and making an open cut, but this was found, after survey, to be impracticable. The work was then abandoned for ten weeks, when the excavation was resumed and the masonry commenced. After seven weeks the tunnel was sufficiently widened, and on Dec. 4th the arch reached a point just 18 feet short of where the heading had been nearly a year before. How they proceeded after this will be told in the next number of the Press.

CONGRESSMAN CAMINETTI, of this State, referring to the debris in the rivers, says: "My idea is to build dams to prevent this damage, saying nothing about a future resumption of hydraulic mining. Then, if dams prove themselves capable of impounding all the debris that can possibly reach them, all parties will probably agree that mining may be resumed. I do not wish to set any one interest against another, but to promote measures in which all can unite." Mr. Caminetti proposes to introduce a bill for the improvement of every stream forming part of the Sacramento-San Joaquin system.

MINERAL CHARACTER OF LAND.—Where a preemption entry is attacked on the ground that it covers mineral land, it is not a sufficient defense to show that the mineral character of the land was not known to the entryman at the date of the entry, if it appears that it was thus known by others at such time, and that the ore was then exposed in such a manner and to such an extent that a person of ordinary intelligence who had been upon the tract could not be ignorant of the existence of the mineral deposit.—*Tinkham vs. McCaffrey*. [Asst. Secretary Chandler, Nov. 2, 1891.]

AMBITIOUS TERRITORIES.—Representative Washington of Tennessee, Chairman of the Committee on Territories, says that the Committee will undoubtedly prepare bills containing enabling acts by which Arizona and New Mexico can hold conventions to form constitutions that may be voted on by the people at the coming election in November. The bills, he says, will in all probability be so framed that the territories may, after the constitutions have been so adopted by the people be admitted by proclamation of the President, so no further action by Congress will be necessary.

Mining and Milling by Electric Power.

History of the First Mining Electric Power Transmission Plant in California.

To Mr. George Cullen-Pearson, manager of the American River Syndicate, an English corporation, belongs the credit of advancing to a practical, successful demonstration long distance power transmission for quartz mill running, and other mining purposes, in California, and perhaps in the world.

Certainly a plant, consisting of a Brush dynamo and motor, had been running a mill in New Zealand for a little time before Mr. Pearson put his in operation in El Dorado county, but it was only a small plant and the distance of transmission was only about one mile. Also, the Virginia City plant, with its dynamos 1600 feet beneath the surface, and its motors a short distance from the mouth of the shaft, down which the water to supply the Pelton wheels was piped, was at work before the completion of the El Dorado plant; but, though the amount of power transmitted aggregated several hundreds of horse power, the distance was comparatively trifling.

The attempt of the Sprague Electric Motor Company to transmit and distribute power by means of electricity at Big Bend, on the Feather river, in Butte Co., had signally failed. In this case there were 12 motors of five horse power each located at various places within eight miles distance from the water power.

At Aspen, in Colorado, the Sprague Co. had at work, with indifferent success, a plant consisting of a dynamo and an electric hoist of nominally 20-h. p., separated less than one mile. But in 1887, when Mr. Pearson conceived the idea of utilizing electric power for his mining purposes, these enumerated plants did not exist, with the possible exception of the New Zealand one.

In that year Mr. Pearson came to California to visit the Gopher Boulder and Dalmatia mines in El Dorado county, in which mines he had large financial interests. These mines were not yielding dividends, owing, as he rightly judged, to the low grade of the rock and large expenses incident to the methods pursued in mining and milling. Chief among the expenses was the one of fuel to generate the steam power used.

Having read in various technical journals of the day, of scientific prognostications, and of practical experiments, tending to demonstrate the application of electricity to the transmission and distribution of power from cheap sources, such as waterfalls, to places where power would otherwise be expensive, he determined to investigate the matter with a view to apply whatever might be good to these mines, in order to decrease operating expenses below the yield of bullion from the mines; in other words, to cease using the profits in buying wood to burn.

In pursuance of this object he came to San Francisco and visited Prof. N. S. Keith, who was then making electric motors, and had some in operation in San Francisco, furnishing power to several manufacturing establishments. These motors were run by electricity generated at the power station of the Pacific Power Co., No. 11 Stevenson St. This concern had then one 40-h. p. dynamo generating electricity to supply the Keith motors. This plant has since been increased to four of the 40-h. p. dynamos.

Prof. Keith assured Mr. Pearson that his scheme was surely practicable, and that he would undertake to construct the necessary dynamos and motors and insure their successful operation.

Being fully assured, Pearson purchased the Williams Ditch, used to convey water to the mines in Coloma, and acquired water rights on Rock Creek and on the American River at about its junction with Rock Creek.

In 1888 he returned to England, and proceeded to engage capital in his new, and then startling, enterprise. Messrs. John Taylor and Sons, the great mining capitalists of London, engaged him to still further investigate. He visited the Big Bend, Feather River plant and the one at Aspen, and the Sprague Electric Co., in New York. Lieut. Sprague thought he could transmit the desired power the required distance, but would not engage to do so under penalty. The experience at Big Bend had made him and his company cautious.

He then visited the Brush Electric Co., in Cleveland, Ohio, where Mr. Brush and the manager of the company assured him that they could, and would, fulfill his requirements. They cited the great plant which they had on the Comstock, and

what it was doing. These statements were, however, the roseate ones of expectation rather than the cold, dark, facts of realization. In truth many months expired before that plant came to work even tolerably. At the present time the speed regulation, and that of the electric current, are not automatic. The constant presence of a man at the nozzles of the wheels is necessary to regulate the apparatus whenever any change is made in the amount of power used in the mill; as in the starting or stopping of any of the plants, pans, crushers or concentrators.

Believing the assurances of the world-famous Brush Electric Co.; the American River Syndicate, which was organized in June, 1889, by Pearson, John Taylor & Sons, and Samuel Jennings, Chairman of the West Argentine Co., of the Argentine Republic, and of the Glen Rock mines, in India, ordered from the Brush Co., a 100 h. p. Brush Generator, and a 60 h. p. Brush Motor; both of the constant current type. These pieces of electrical apparatus were delivered in Placerville in the latter part of 1889, but owing to the bad roads and bad weather of that exceptional winter, they were not put in place, ready for operation, until May, 1890. "And then the trouble began."

Our illustration No. 5, on the first page of this issue, shows the power house, where the Brush dynamo is located, at the mouth of Rock Creek, where it empties into the south fork of the American river. The descent to this place is 1400 feet within about a mile. The dynamo weighing several thousand pounds, had to be lowered by rope tackle the last 800 feet of the descent.

The first start was made May 19th, 1890, but immediately it was found that there was no automatic regulation. The governor of the Pelton water wheel did not suitably govern the speed of the wheel, the automatic system of regulating the current from the dynamo did not operate, and the governor of the motor at the Dalmatia mill, over two miles away, did not govern the speed of the motor. The apparatus was nominally of 40 amperes capacity, with the volts variable to suit the amount of power used by the mill. Much time was consumed by the experts (?) sent by the Brush Co., to set up the plant, and instruct others to run it, in endeavoring to make these several ungoverned pieces of apparatus work in unison and give a constant rate of speed of the mill; but without success; and they finally left in defeat.

But Pearson and his superintendent, W. H. Husband, were not to be thus easily defeated. After the retirement of the experts they started to experiment for themselves, and soon found that by placing a man at the lever by which the nozzle directing the water on the Pelton wheel was deflected, and letting him know by telephone how many amperes of current were needed, he could cautiously set the speed of the wheel which drove the dynamo until it furnished the desired amount of current to actuate the motor so that it ran at the speed which was necessary.

They found by experiment the various numbers of amperes which would run any or all parts of the mill; so that, by telephone, when changes were to be made in the mill, the man at the station was notified to make the suitable changes at his end of the line. This was found out in July, 1890, and from that time until August, 1891, the plant was run continuously without any very serious delays.

In February, 1891, at a meeting of *The Institution of Civil Engineers*, in London, during the discussion on "Electric Mining Machinery," Mr. John Taylor said he did not intend to take part in the discussion with regard to electrical machinery generally, but he was able to give some facts which would be of interest, because they were the results of working mines upon a considerable scale during a period of several months. He referred to some gold mines in California, the property of a company of which his firm had the management. They had been abandoned for some years, in consequence of the impossibility of working them to a profit by steam power, the ores being of low grade. The matter was brought to his notice two years ago by Mr. G. Cullen Pearson, who was interested in the mines during the period of their working by steam power. Mr. Pearson saw the future possibility of the transmission of power by electricity, and secured, in addition to the interest he then had in the mines, water power at a distance of about two miles. This was utilized by a Pelton wheel 87 inches in diameter, and capable of developing 125-h. p., with 400 miners' inches of water under a pressure of 110 feet. This wheel drove a Brush generator of 100-h. p. The current was transmitted to the mines, which were at an elevation of 1400 feet above the power station, and a distance of 10,890 feet (just over two miles), by a No. 3

insulated copper wire less than a quarter of an inch in diameter. The wheel and the generator were capable of developing 125-h. p., but they were not working up to that. The exact length of wire to complete the circuit was 22,588 feet, or four miles and one furlong. At the mines there was a Brush motor working up to 60-h. p. actual. It drove a ten-stamp battery, and three Huntington mills besides, equal in all to a forty-stamp battery, and there was also a large rock-breaker. In addition, all the mills and buildings were lighted by incandescent lamps by the current taken direct from the transmitting wire. The power required for running the machinery as at present used was from 41 to 43 electric h. p. There were ammeters and voltmeters placed both at the power-generating station and at the mills by the Brush Company, who put up the plant, and they were guaranteed by them to be correct. The electricians present would be able to give their opinion as to whether there could be anything questionable in the results given by these instruments. Mr. Pearson had himself made numerous observations by means of a telephone from the generating station to the mines, and Mr. Taylor had received from him particulars of one taken on the 12th of January. At the power generator there was registered 29 amperes at 1250 volts, equal to 48.47 electrical h. p. The current at the mills at the same time was 28 amperes and the pressure 1100 volts, equal to 41.47 electrical h. p., so that practically they were receiving at the mills from 83 to 85 per cent of the h. p. generated as actual working energy, at a distance of over two miles. They were confidently told by the electricians who put up the machinery that a wire two sizes larger would give from 2 to 5-h. p. additional. They might therefore talk about 90 per cent of the h. p. at a distance of more than two miles. Mr. Pearson had mentioned a variation of from one and a half to two per cent in the power delivered, which, it appeared, was dependent upon atmospheric conditions. It might be easily understood that there was a larger efficiency in cool dry weather than on a warm, damp day. The electricians of the Brush Company stated emphatically, after the work had been going on for some time, that they might safely reckon upon 70 per cent of the h. p. at a distance of 12 miles. The experiment was not a small one; the work had been going on since August, day and night unceasingly. They had a good deal of trouble at first, but after everything was in order they went on without a single interruption. The most remarkable thing was the small amount of wear and tear, which appeared to be confined to the copper brushes and the copper segments of the commutators. Mr. Pearson had given the whole expense of the renewals and for oil at only \$25 per month, which was, of course, a mere trifle. He had proved, during that period of five months, that he required no skilled men. Two miners had been instructed, and they attended solely to the machinery where the Pelton wheel and the dynamo were working. Up at the mill, there was no supervision whatever of the motor beyond one of the men going in to see that the oil cups did not run empty. The machinery, Mr. Pearson stated, was entirely under control, and in all his experience he had never had to do with a motive power which could compare with it for economy, cleanliness, steadiness and the ease with which it could be handled. Between the 1st of August and the 31st of December the machinery had dealt with 19,000 tons of rock. The gold was extracted at the remarkably low average cost for mining and milling of 50 cents—or 2s. 1d.—per ton, heating, as far as Mr. Taylor's experience went, any record even where there was water power close to the scene of operations. It would be readily understood that there was an enormous field opened up for working mines and many other industries under similar conditions. Mr. Pearson's statement was a remarkable one, and he placed it before the Institution as the actual result of a large operation over a considerable period.

We add: That the mill crushed 43,000 tons of rock in the 13 months from July, 1890, to Aug., 1891. In Oct., 1890, there was crushed 4448 tons, which were mined and milled at the total cost of 43 cents per ton. View No. 1 shows a part of the Dalmatia mill.

The 43,000 tons were taken from the open cut, shown in View No. 4 on the first page, pending development work below. This cut is 50 feet wide and 75 feet deep.

In 1891 the syndicate acquired the St. Lawrence mine, 3.6 miles from the Dalmatia (exact distance 19,100 feet), and ordered from the Electrical Engineering Co. of San Francisco, which had succeeded Prof.

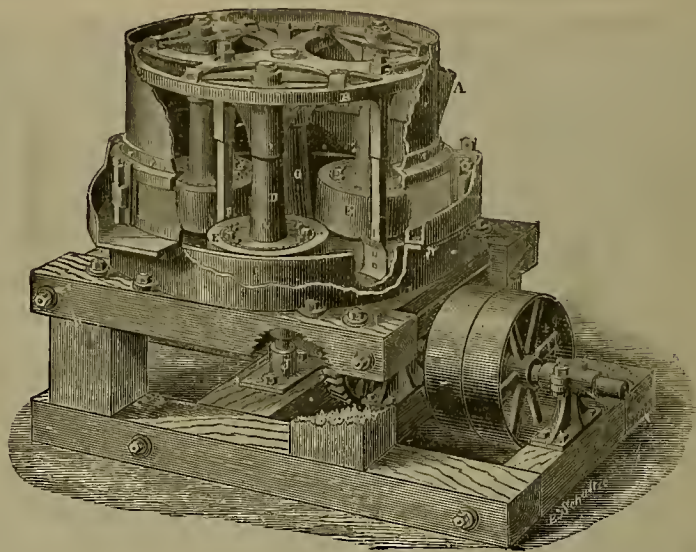
(Continued on page 65.)

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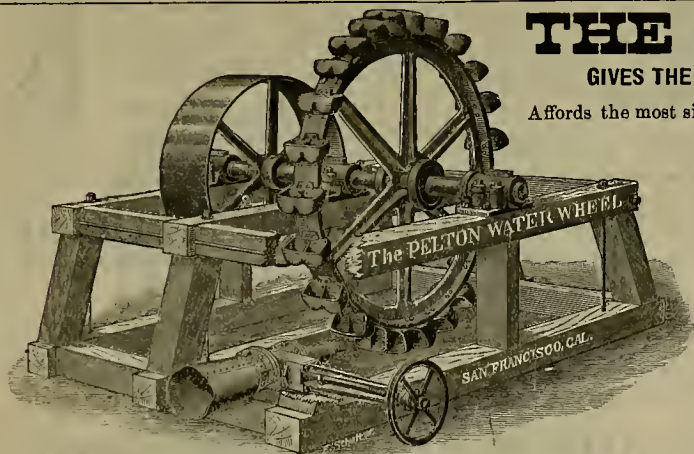
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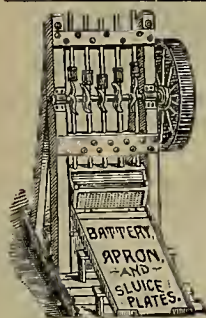
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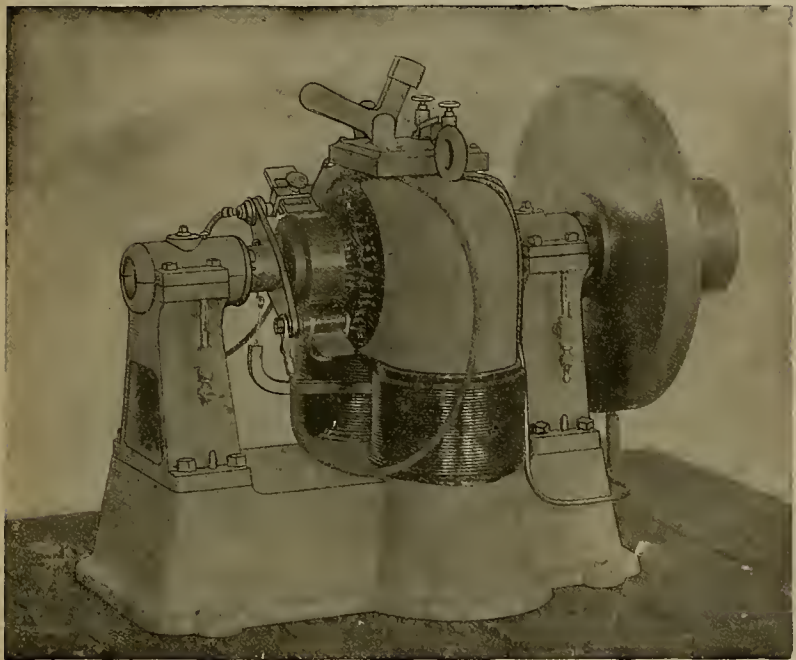
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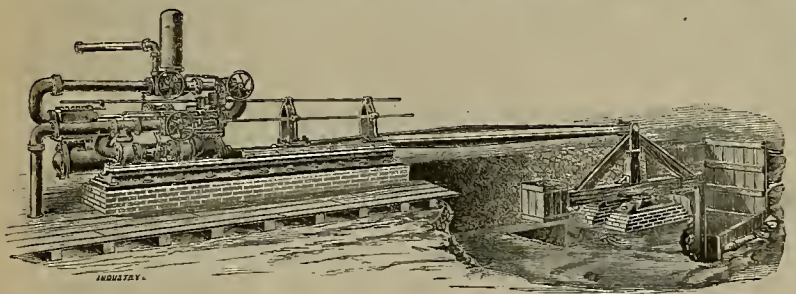
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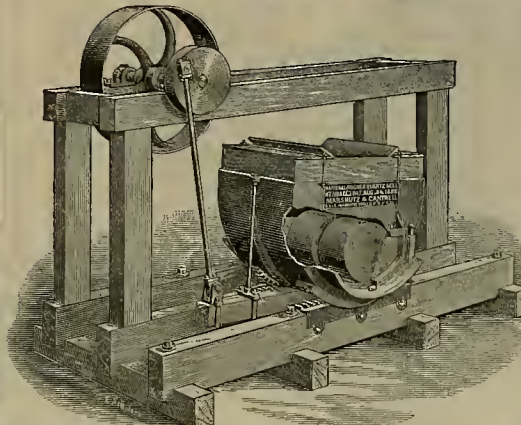
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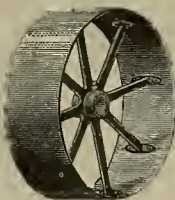
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Mining and Milling by Electric Power.

(Concluded from page 62.)

Keith's business, a 25-h. p. Keith motor to run the mill which the syndicate erected at the St. Lawrence.

Accordingly the line was extended from the Dalmatia mill to the St. Lawrence by running upon suitable insulators on poles 38,200 feet of No. 3 bare copper wire, and the motor, shown in Fig. 6 on page 65, was installed and started on the 30th day of Oct., 1891, and has run successfully ever since. The total distance from the power station at Rock creek to the St. Lawrence mill is 29,990 feet or 5.68 miles.

The Electrical Engineering Co. undertook the problem of adjusting the Brush apparatus so that it would work in harmony with the Keith motor, and also furnish a suitable current of electricity to light the office and residence of Manager Pearson, located midway between the Dalmatia and St. Lawrence, and also the St. Lawrence mill.

As the motor made by the Electrical Engineering Co. was made to run and govern perfectly on 30 amperes of current, all the other things were made to do the same, except the Brush motor. But that was so adjusted that, while it is not self-regulating, suitable movements of the brushes manually made, keep the speed approximately at the normal when changes in the power are made.

The circuit consists of 59,980 feet of No. 3 copper wire, the dynamo and fifteen 16-candle power lights at the Rock Creek station; the motor and thirty 16-candle power lights at the Dalmatia mill; thirty 16-candle power lights at the superintendent's residence and office, and the Keith motor and fifteen 16-candle power lights at the St. Lawrence mill.

The "Automatic Man Regulator" is continued at Rock creek and will be until the contemplated changes and additions have been made. The loss of power due to the transmission, that is, that which is absorbed by the wire, is constantly 12.06-horse power.

for battery purposes is attainable. Until the mine is put into working order the mill, shown at the left of the View No. 3, will be run on material from the dump.

View No. 2 on the first page shows a part of the Rock Creek ditch. Much of the ditch was cut through solid rock as there shown. We are indebted to Mr. Horace E. Levesley, who is shown standing on the bank of this

within many miles radius. He has already applications for many hundreds of horse power within ten miles of his power station. He is so well satisfied with what has been done for the syndicate by the Electrical Engineering Co., and with its success in the matter of electricity for mining purposes, that the Brush apparatus will be replaced by that of the Electrical Engineering Co.,

When we shall have seen, within a few years hence, the many hundreds of thousands of horse power available in our mountain streams utilized for mining and other purposes by means of electricity, this plain recital about the first essay of the kind will not have lost its interest.

Mining Share Market.

Comstock mining shares exhibited more life the past week, with the entire line moving up. The advance in the market can be traced both directly and indirectly to the action of the combination of leading brokers not controlled by pools and rings. The object of the combination is, so far as the writer is able to learn, to make the pools and rings that have been victimizing the outside shareholders and looting the mines, enter the market and buy the stock with which to control the mine or mines, and in this way they look for much healthier times. They will also try and force mine managers to have the mines worked and the ore milled to conform to the laws of California, under which the companies incorporated. That the brokers' movement promises good results is witnessed in the more active mining share market, and also the reports of mining superintendents beginning to be fuller and much more satisfactory. When these reports give mine or car sample assays, and other particulars, together with width and assays of all ores found, then a reformation is secured and outside dealers will have more confidence in the market. Until this is done, dealing in stocks is very risky and one-sided—assessments for the public and bullion for inside pools and rings.

There can be no question but inside stock pools and rings contemplated sending the market for mining shares to the low prices put out through cappers, but the brokers' combination prevented it. It is deserving of special mention that heretofore inside pointers have been recently wrong, which shows that the market does not move altogether their way. Outsiders should stand in with the brokers who are fighting for an improvement in the management of the mines. It is the only way in which the long-desired better times can be brought about.

Outside mining shares have ruled dull and heavy. It looks as if there will not be an improvement in that direction until the brokers force mine managers to enter the market and buy their stocks in same way that Comstock mine managers are being compelled to do.

At the annual election of Sierra Nevada, held on yesterday, the ring voted 3250 shares of stock and nearly 70,000 in proxies. One broker firm, Reh fish & Co., alone gave their proxies amounting to nearly 30,000 shares. A. G. Gurnett, for the broker combination, voted nearly 25,000 shares and proxies from actual owners. The total number of shares and proxies voted was 98,724. This is a good commencement for the brokers, for they secured one director. It is said they would have secured two had it not been for John Wall's "falling down."

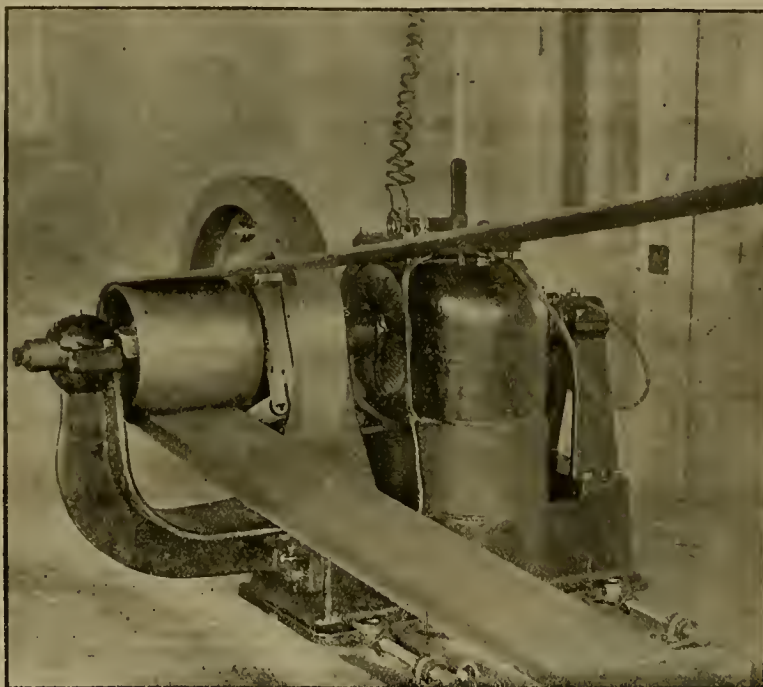
The Mining Stock Association have forwarded to Congress a full list of the "unknown" bullion which was put through the Carson Mint for the mill ring, and also the names of the guards that let Evan William into that institution at midnight, and have demanded an investigation of the whole matter, that it may be made public to all stockholders.

It is currently reported and believed that inside rings paid some brokers 5 to 15 cts. per share for their proxies to be used in the Sierra Nevada election.

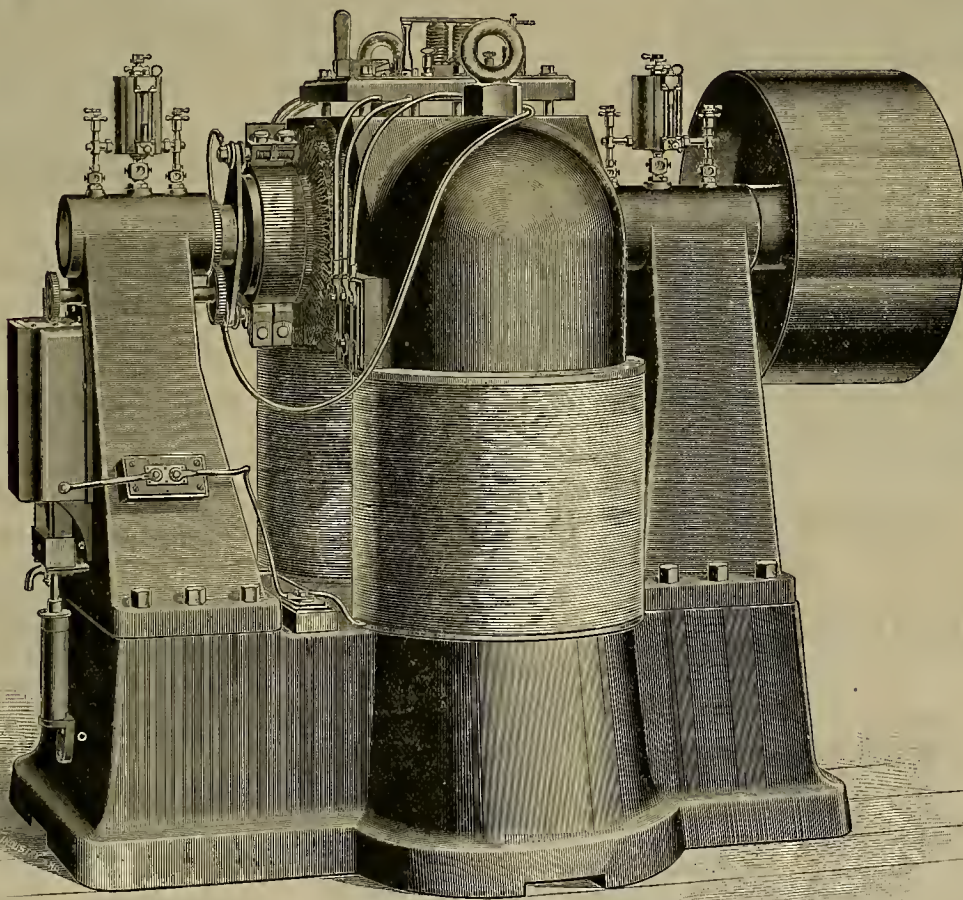
News that is coming to hand from the Comstock mines, is more encouraging. To be sure it is old—known to miners for many months, and in some instances for several years, yet it shows that good results are following the developments in M. W. Fox's suit against the directors of the Hale and Norcross Mining Co., and also the sustaining by the Supreme Court of California, of the validity of the laws under which mining companies are incorporated, and that these laws must, in all particulars, be conformed to. A few more suits by outsiders for damages against mine directors ought to be brought, so as to make them realize they are not above the law, and are not to be used as cat's paws. The Nevada mill, of 60 stamps, is running on ore from Hale and Norcross and Savage. Will this mill run the annex? If not, why are the car sample assays not given? It is given out that there is an improvement in its west cross cut, being run by Hale and Norcross on the Sutro tunnel level. This is confirmatory of the MINING AND SCIENTIFIC PRESS assertion of finding many months ago in the Middle mines of a 40 to 50 foot ledge to the west. Every statement heretofore made by us about the west ledge, will, in time, be verified. Probably this will come about when the mill rings find they cannot get away with the bullion. About a year ago this paper stated that work on the 1750 foot level in Con Virginia would develop to the west high grade ore, now it is being confirmed officially, but of course its recent find is accidental. Sierra Nevada reports better prospects, as does Mexican. Chollar reports richer ore on its lower level. Potosi reports early officially the finding of ore, published by the PRESS early in last year. The ore found in the Ward shaft has not, as yet, been officially reported. The secret work in the Gold Hill mines, is very important, but probably it will not be made public until after another line of assessments is levied and collected. The Alta group, if differently managed, would be paying dividends. We are in receipt of confirmed advices of a decided improvement in Overman, but it fails to be mentioned in the official letters. The water in the Gold Hill and South End mines is being pumped out more rapidly. The water could have been taken out several months ago, had the managers desired, but then they would not have had an excuse for levying assessments.

From the outside mines official letters report still higher assays of Bulwer ore. This mine if properly managed, ought to pay dividends soon. More favorable news is received from Bodie and Mono. From the Quijotas official letters report the mill running steadily and that the ore assays higher. The "Razor Blades" do not report any change. Usual high assays, but no dividends continue the rule from them.

Mining shares opened this (Thursday) morning active and higher. After regular call there was continued activity with still higher prices reached.



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This power is essentially necessary to the St. Lawrence, because under steam power no rock paying less than \$9 per ton could be profitably mined and milled. The mine is at such an elevation that no direct water power is available. Barely sufficient water

ditch, for these and many other photographic views of the mines, mills, etc., operated by this electric plant.

Mr. Pearson has acquired the use of 6000 inches of water from the American river, and is constructing a ditch to bring it to a fine location at the mouth of Rock creek for a power station. Owing to the precipitous banks of the river, and the lack of fall at other places, he has the only considerable water power on the river for many miles. This amount of water will give him 1500-h. p., which he will sell at acceptable rates and deliver electrically to the mines and mills

and the additions will also be made by it. Electric pumps and electric rock-drills, as well as electric hoists, will be erected by the latter company for the syndicate. This company is now installing electric pumps, drills and lights for the Idlewild Co. at the Taylor mine, seven miles from the Rock Creek station.

Our view No. 7 shows a 120-h. p. dynamo, made by the Electrical Engineering Co., and such as will be installed at the Rock Creek and American River stations. It is perfectly self-regulating, even under great changes in speed of rotation.

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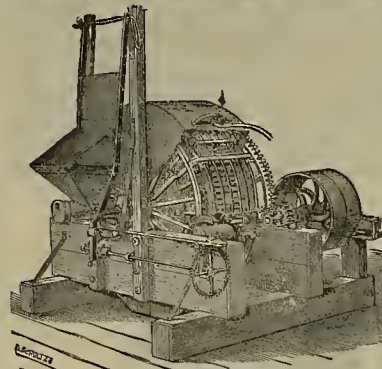
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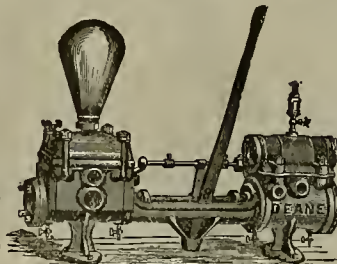
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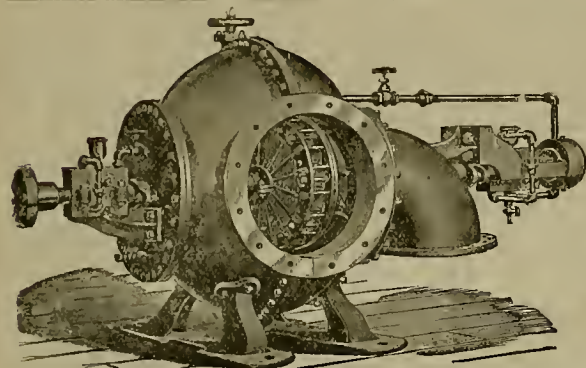
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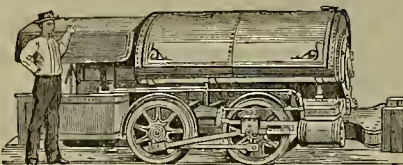
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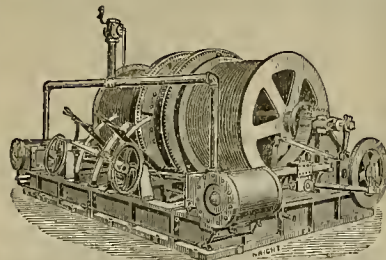
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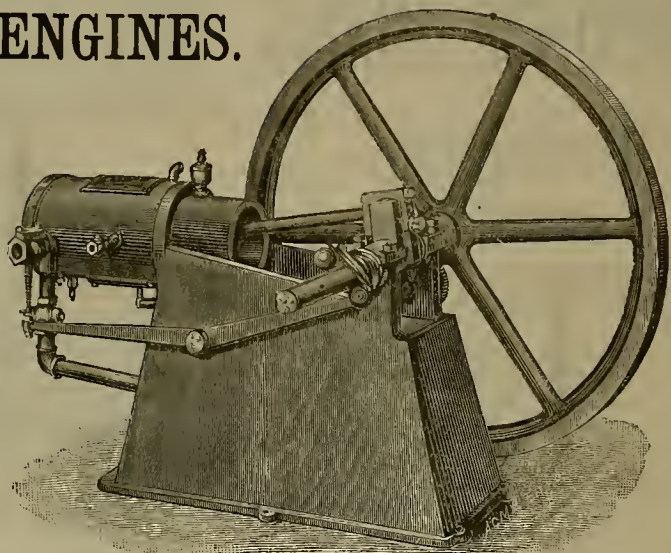
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Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY.
Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees, held on the 8th day of January, 1892, an assessment (No. 68) of Thirty (30) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 69 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1892, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the first (1st) day of March, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Trustees.

Office—Room 69 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

SAN FRANCISCO MILLING AND MINING COMPANY.
Location of principal place of business, San Francisco, California; location of works, West Point, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of January, 1892, an assessment (No. 1) of Two (2) Cents per share, was levied upon the issued Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 56 Nevada Block, 309 Montgomery Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of February, 1892, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 8th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
CHAS. H. OSBORN, Secretary.
Office, Room 56 Nevada Block, 309 Montgomery Street, San Francisco, California.

GRAY EAGLE MINING COMPANY.—LOCATION OF
principal place of business, San Francisco, California; location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of January, 1892, an assessment, No. 27, of Six (6) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of February, 1892, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 7th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
A. W. BARROWS, Secretary.
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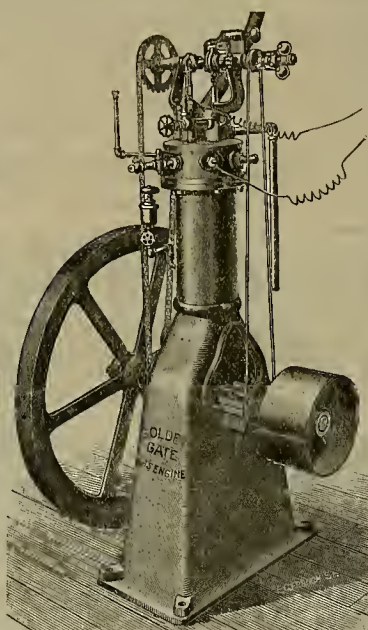
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DELINQUENT SALE NOTICE.

CALIFORNIA CREAMERY COMPANY.—LOCATION
of principal place of business, San Francisco, California, No. 111 Front Street. Location of works, Novato, Marin County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of November, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No.	Cert.	No.	Share.	Amt.
Kauplich, Julius	3	60	\$2,400	00	
Kauplich, Frank M.	4	60	2,400	00	

And in accordance with law, and an order of the Board of Directors, made on the 24 day of November, 1891, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, 111 Front Street, San Francisco, on MONDAY, the 11th day of January, 1892, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with cost of advertising and expenses of sale.

CHAS. MERSEFELDER, Secretary.
Office, No. 111 Front Street, San Francisco, California.

At a meeting of the Directors of the California Creamery Company, held to-day, the day of sale of the above delinquent assessment was postponed to MONDAY, February 1st, 1892, at two o'clock P. M., at the office of the Company 111 Front Street, San Francisco, California.
CHAS. MERSEFELDER, Secretary.
San Francisco, Jan. 11, 1892.

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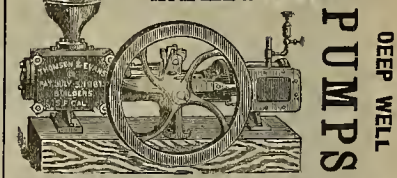
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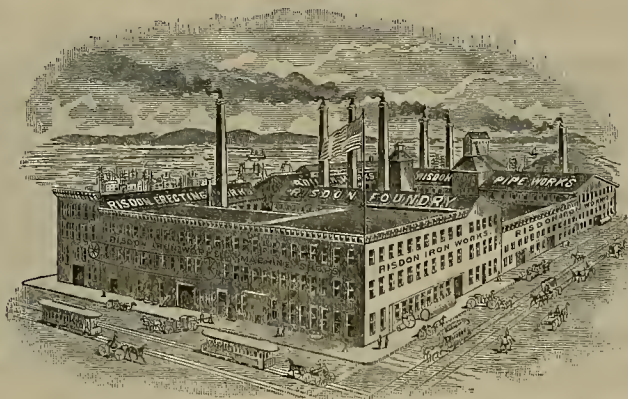
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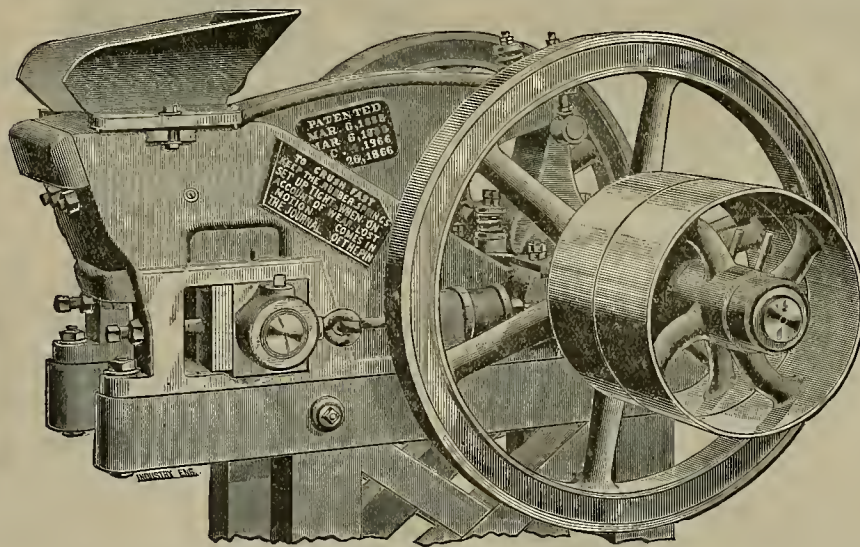
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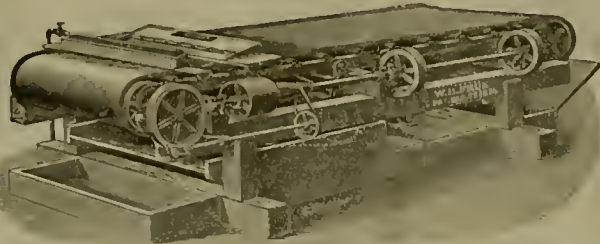
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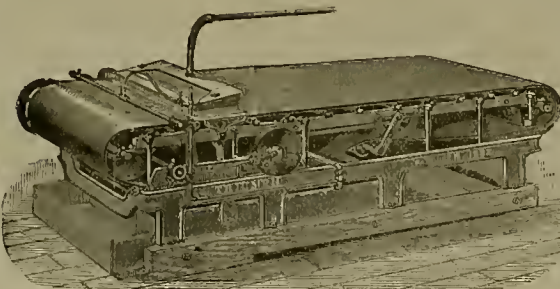
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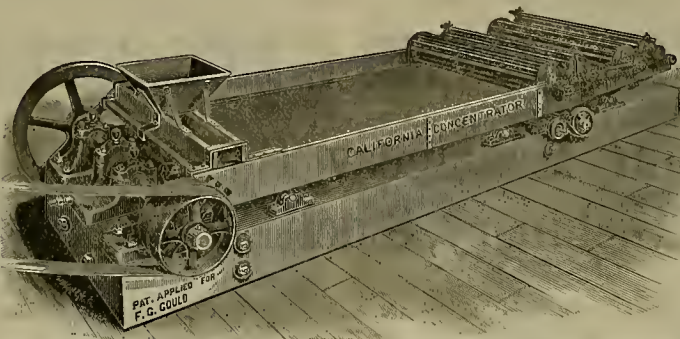
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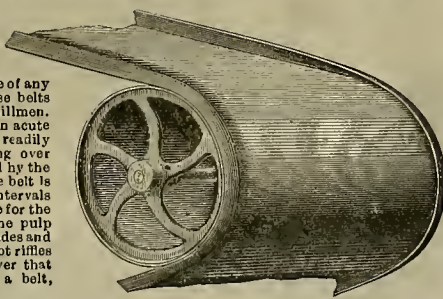
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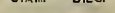
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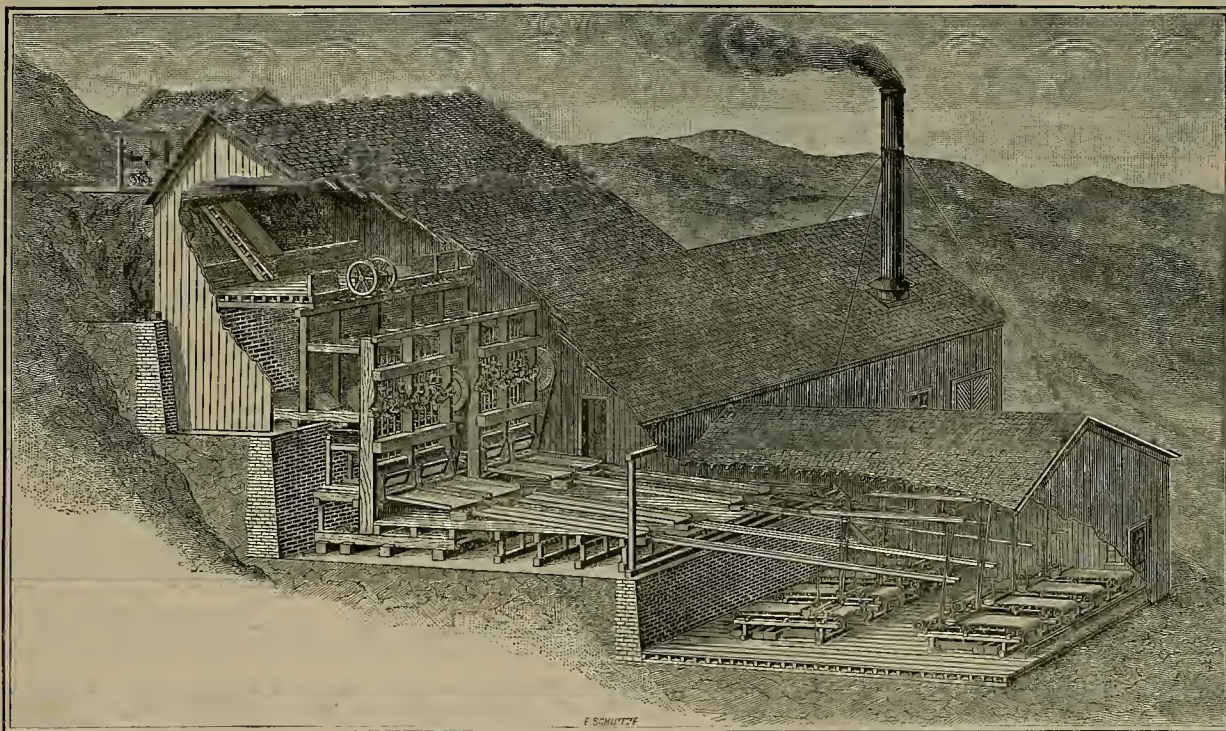
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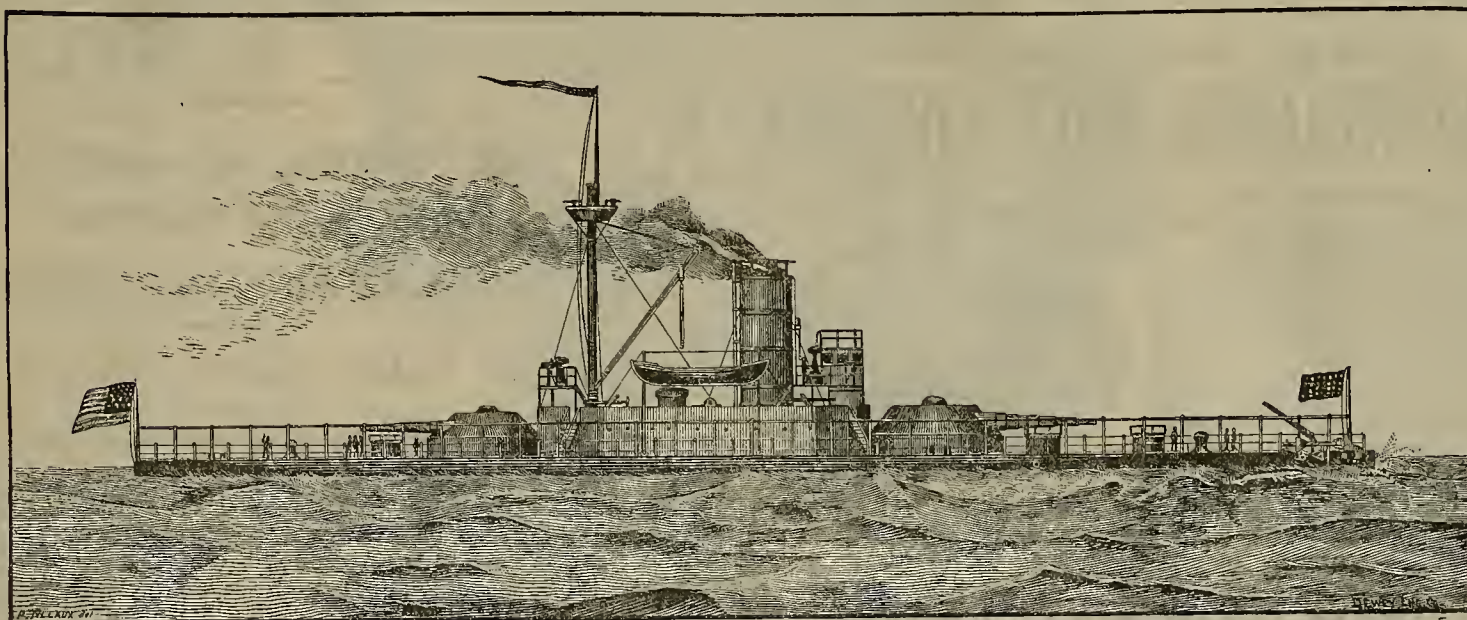
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The State Officers.

J. H. Neff of Placer county, who has been elected President of the California Miners' Association, has been in California since 1850, residing all that time in the county of Placer. He is a Pennsylvanian by birth, but lived ten years in Iowa before coming to this State. Mr. Neff has devoted himself to both quartz and drift mining ever since he settled in California and is a thoroughly representative miner. He has also held several official positions and is at present one of the State Prison Directors.

Mr. Neff was in Auburn when the initial movement toward this State Miners' Convention was made, and was elected chairman of the caucus or meeting which issued the call for the Placer County Convention. When that was held he was elected chairman of the convention, and of the Executive Committee which issued the call for the State meeting.

As chairman of that Executive Committee, the duty devolved upon him of calling the State Convention to order. He was then chosen temporary chairman and subsequently permanent chairman. On the California Miners' Association being perfected he was chosen President, both as a token of personal appreciation and as a compliment to the county he represented.

Mr. Neff made an excellent chairman of the convention and performed the duties to the satisfaction of all.

W. C. Ralston, the Secretary of the California Miners' Association, was born and educated in San Francisco. His first work was as an assayer in the Selby Smelting Works, where he was engaged for a year. He then worked a hydraulic mine for four years in Placer county, above Michigan Bluff. Subsequently he became Superintendent of the drift mines about 12 miles above Forest Hill, belonging to the Societe des Mines d'or du Forest Hill Divide, Eugene Renevey, President, head office, Paris, France. Mr. Ralston remained at these mines two years, when he came to this city. He is a practical miner and has always been interested in the mining industry. His father, W. C. Ralston, of the Bank of California, was one of the best known men on this coast, and largely interested in mining property. He had large investments in the North Bloomfield and Milton hydraulic mining companies,

and was one of the first to put money into opening the Bloomfield property.

Young Mr. Ralston acted as Secretary of the San Francisco delegation, and was urged by many friends from various counties for the Secretaryship of the State Convention. He acquitted himself so well in that position that he was unanimously chosen as Secretary of the permanent State organization. A great deal of labor has fallen on him in the past few weeks, for the cause of the miner, but he has done his work well and promptly.

A Kindly Feeling.

There have been more pleasant and kindly notices of mining interests and mining men of California within the past week, from the press of the State, than has been the case in the past ten years. Not only have the great dailies of San Francisco and other large cities discussed the subject in a favorable way, but the journals of the interior, in both mining and farming communities, have had good words for the miner and his business.

All this augurs well for our mining industry.

The Quartz Interests.

Some of the quartz miners who attended the convention, were of the opinion that the hydraulic interests overshadowed to too great a degree, the other branches of the mining industry. This was, however, to have been expected, since it is the hydraulic mining branch, over which there has been the most litigation and dispute. It was that branch too, on which the report of the Government engineers was based, and the one which had been practically annihilated by the decrees of the courts.

The quartz interests, however, were by no means overlooked. Various resolutions relating to unjust department decisions, rulings, etc., were formulated; also others concerning the "paying mine" proposition, "valuable mineral," the disputes between agricultural and mineral claimants, and the mineral on railroad grants.

It was thought, however, best to give these subjects more careful consideration than could be the case in a crowded and hurried convention. All the resolutions concerning these legal branches of the subject were referred to a very competent committee who will at once formulate them properly. Their report will be forwarded to our Representatives in Congress, and the committee of the California Miners' Association which goes to Washington very shortly will aid as far as possible in seeing them properly recognized by the mining committees of Congress.

OUR Congressmen from this State will have to "rustle" this session. The several committees sent on by the Mining and River and Harbor Conventions will give them plenty of work to do. If these Congressmen want to make any "records" for the benefit of their constituents they will have an opportunity to do so under the immediate observation of committees of said constituents. But if they show lack of interest or fail to lend assistance they will be apt to hear of the subject on a future occasion.

JUDGE J. M. WALLING of Nevada county took the most active part in framing the constitution and by-laws of the State organization; and, in fact, it was due to his presence on the committee that the work was done so promptly, and the document produced so concise in form.



Hon. J. H. Neff, President.



W. C. Ralston, Secretary.

PRESIDENT AND SECRETARY OF THE CALIFORNIA STATE MINERS' ASSOCIATION.

The engravings on this page are from recent photographs of the gentlemen.

A DEPARTMENT OF MINING.—Congressman Camminetti, of this State, will shortly introduce a bill creating a new department and adding one member to the President's Cabinet. The object is to develop and take better care of the mining interests of the country. The new Government division will be known as the Department of Mines and Mining and the official in charge will be called the Secretary of Mines and Mining. He will have an assistant, and the salaries of both will be the same as those of the other secretaries and their assistants. The bill takes the Mining Bureau, including the sale of mineral lands and the Geological Survey, from the Interior Department, and the Mint Bureau from the Treasury Department, and places them in the new section of the Government. If the bill passes it will go into effect on March 4, 1893.

The miner has placed before the public his grievances and his needs, and the questions are better understood than ever before. To a class which has been ignored or persecuted for years all this is refreshing and pleasant. It was not supposed by many that such a kindly feeling really did exist, but that it did is evident from the tone of the press.

All that was wanted, apparently, was a plain, concise statement of the conditions, from the miner's point of view. He has not always had the chance, it must be confessed, of making this statement from his point of view. Therefore the press and public have not been heretofore properly informed. The proceedings of the convention were such as to attract universal attention, and the miner's side has been so temperately and sensibly set forth as to bring conviction to most minds that his interests need the assistance of the press and public.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ed.

The Oil Wells of Kern County.

SAN FRANCISCO, Jan. 23, 1892.

TO THE EDITOR:—The monotony of travel through the San Joaquin valley is only for those who see nothing interesting in agriculture or horticulture. To those whose business or inclinations are in these lines, the journey affords the full measure of delight. There are certain phases, however, which interest even the indifferent, and, fortunately for me, a stopping-place on my trip was at Bakersfield, the most important place in the southern part of the valley. Although Bakersfield and the surrounding country possess certain great advantages, investors and actual settlers have not availed themselves of them so extensively as has been the case both north and south of here. They are coming, however, in constantly increasing numbers, and when they come they generally stay. By the kindness of J. S. Drury, Esq., I was shown a portion of the irrigating system in this vicinity. The water supply is far in advance of the settlement, which is generally the reverse in most sections.

THE CANALS AND BRANCHES

Are over 300 miles in length. One canal, the Calloway, is 100 feet wide on top, 80 feet on the bottom and 8 feet deep. The flow of water through one of the smaller canals generates power to operate the machinery of a large flourmill, this being the only utilization so far of the tremendous available water power.

Kern river, flowing through this country, furnishes an abundant supply of water to the canals and ditches, and what is remarkable, and probably the only case of the kind, it furnishes a fertilizer, and one of the best known, viz.: gypsum. This is caused by the course of the river being through vast deposits of this material in the mountains and foothills, which is disintegrated by the action of the flowing water and the fine particles carried along and distributed on the soil wherever the water is used for irrigating. Water is a necessity, but the fertilizer is a luxury, and that the soil appreciates it is shown by the surprising growth of fruits and vegetation where it is used, as instanced in the fine exhibition at Drury's drug store of fruits preserved in an antiseptic liquid, which has, unfortunately, destroyed the natural color, which on the peaches was unusually brilliant. The size, however, of the fruit excites wonder; some of the peaches, for instance, are more than 13 inches in circumference and weigh over 22 ounces. These peaches were raised by Mr. C. A. Maul, who ascribes the success of himself and others largely to the natural conditions here extant. In concluding this brief outline of the subject, allow me to advise you to make a personal inspection, and I can assure you a pleasant welcome, for the people are as "fine as the fruit," and that is the highest degree of praise.

THE SAGEBRUSH PLAINS.

Now for the oil wells, the objective point of my visit to Kern county. The Sunset Oil Co.'s property is about 45 miles in a southwesterly direction from Bakersfield, the nearest railroad shipping point. The road is over a level country and the through trip can be made in six or seven hours with a good team and light load. Teams heavily loaded require a day and a half or two days. After leaving the irrigated district, which extends 10 or 12 miles out from Bakersfield, and which is marked by some beautiful homes and fine farms, the scenery consists of an almost dead level sagebrush covered plain, broken on one side by Buena Vista lake and on the other and ahead by the foothills of the Coast Range. The denizens of this plain are coyotes, jackrabbits, birds, etc., which have plenty of time and the proper means of locomotion to cover long distances in search of water, for after leaving the Half Way House (22 miles from Bakersfield) there is no drinking water until the Oil Wells are reached, and it is hauled there from a spring 8 or 10 miles beyond in the foothills. If the sagebrush plain is uninviting, nature shows no inclination to make amends in the country immediately surrounding the Oil Wells. On the contrary, she seems to have attempted a climax of offense to the senses of sight, taste and smell.

MALTHA OR MINERAL TAR

Flows and oozes from crevices and seams in the broken and upheaved rock formation, forming pools and patches acres in extent. In course of time, by oxidation and evaporation of the volatile constituents, the mass is solid and hard in cold weather, but soft and sticky under the rays of a hot sun, forming a trap more cruel than quicksand

to any animal so unfortunate as to be ensnared in the black, viscid compound. Quicksands draw their victims beneath the surface and end their misery, but here they are held until they perish by starvation or thirst. Bones of bears, cattle and other animals are found, and even some thought to be of human beings. Springs and streams of water in the vicinity are impregnated with sulphur and various salty, alkaline, and in some cases arsenical compounds, which render them repugnant in taste and odor and often poisonous. Where pits have been excavated in the sulphur deposits, the air is laden with fumes resembling those of burning sulphur.

THE SUNSET OIL COMPANY.

The foregoing are the first impressions of a superficial observation. Discriminating, practical minds see great utility in these unseemly products of nature, and operations of the Sunset Oil Co. shows a combination of capital and intelligence, which has established a very promising industry, and money is being freely expended to widen the field of operation. They can furnish an immense quantity of excellent asphalt for which there is great demand.

Its various applications already numerous are being constantly multiplied. Varnishes and paints made from it are noted for their gloss, durability, tenacity of adherence and resistance to moisture. Posts, tiles, iron pipe or other iron articles, ships bottoms, or in fact any article or material is protected by it, from the action of salt or fresh water or acids, and is used for water-proofing cloth. Being a nonconductor of electricity it will find extensive use as an insulator. A mixture of asphaltum and sand moulded under hydraulic pressure, has a resisting strength of 250 pounds to the square inch, and water pipe made in this manner is incomparable in many respects. Vast quantities are used for street pavements, sidewalks and roofing.

At the coal mines are millions of tons of "waste" or powdered coal which can be made an excellent and cheap fuel by intermixing a small per cent of asphaltum and forming into blocks. The above are a few of its uses, and the fact that nine-tenths of the asphaltum used in the United States is imported from the island of Trinidad, shows the value and necessity of all developments in California. An order for 30,000 barrels of oil awaits the company's option, and in fact the demand for its products is like the supply almost unlimited and the prices good. Quite a force of men, 30 or more, has been employed at good wages. The individuals of the company have won admiration by their enterprise and success. They have added to the taxable property of Kern county and the trade of Bakersfield. The asphalt can be laid down at nearest railroad shipping point (Sumner) at a cost not exceeding \$20 per ton. At Chicago, Kansas City and other Eastern points it sells for \$60 per ton. The railroad freight tariff to Eastern points is \$40 per ton, presenting the amount of profit due to the enterprise, a state of affairs which we hope will be remedied. It is due to the railroad company to say that \$40 is their schedule price for transportation and a lower rate would be a concession on their part, which would show a willingness to encourage an industry which would add to their own business and be a profit to others.

The sulphur is also barred out of the San Francisco market by a rate as against a \$3 rate from Japan, which now supplies the California demand. It will be seen from the great store of natural products the owners of these properties could draw dividends for an extended period of time, provided transportation was cheapened. That it soon will be, is probable, as preliminary work on a competing line has already been done in Tejon Pass, and a convention has been called to consider the building of a railroad from Bakersfield to Port Harford. As regards actual operations the Sunset Co. has been pumping a heavy oil termed maltha, from five wells which vary from 90 to 300 feet in depth, and probably having a capacity of 50 or 60 barrels per day. This maltha is used in the

MANUFACTURE OF THE REFINED ASPHALTUM

Two barrels being added to a ton of the crude material, the mixture being boiled in iron vats, the impurities are allowed to settle, the clear asphaltum being drawn off into wooden boxes for solidification, and is then ready for shipment. The remaining refuse is the fuel used in the furnaces. Twenty-four hours is required for each run, the present capacity being about 12 tons per day.

By an ingenious device the five wells are pumped simultaneously, although some are 100 feet or more from the engine. Wooden rods, one end attached to the mechan-

ism at the well, are connected at the other end to a wheel with a reciprocal motion which is actuated by a pitman rod, operated by the driving wheel of the engine.

In closing I wish to acknowledge the courtesy extended to me by Mr. H. A. Blodgett of Jewett & Blodgett, bankers, the Messrs. Hambleton, Skelton and other friends. V. C.

Who Invented the First Hydraulic in California?

SHADY RUN, Jan. 15, 1892.

TO THE EDITOR:—I have heard of a dozen or more of miners, in as many different localities along the gold belt, who each claim to be the first inventors. Was it an invention in the early stages of the process? All we have of its early history is in scraps, and comes to us second-handed; and as no patent was ever obtained or applied for, it has always been an open question.

Perhaps no better opportunity will ever be offered for learning something about the early history of hydraulic mining, from the living actors, than at the meeting of miners in San Francisco on Jan. 20th, where representative miners from every locality in the State will be in attendance. As hydraulic mining will be a prominent subject for consideration, its early history may be interesting to many who have never seen anything but the Monitor and Giant at work. The probability is that many of the old timers will be on hand at this convention, from whom a record could be obtained of their experience and observation in regard to the first hydraulic mining in their respective localities.

[Being unable to attend said convention, I hereby tender my best wishes for the success of this movement in the right direction, and hope by "keeping it before the people" and Congress, the object can be speedily accomplished.]

For a starter on the subject of the first hydraulic mining in the locality where I then lived, I herewith give my experience.

In the season of 1853-54, we were working our claims at Indiana Hill by ground-sluicing, washing the bank off in benches eight or nine feet in depth, running the water over the bank in a broken stream. After working down two benches, the spray from the water falling such a distance made it uncomfortable for the men working next the bank. To remedy this, I procured a piece of six-inch hose to convey the water over the bank. After getting down a cave, I would take the lower end of the hose and compress the outlet as much as possible with my hands. I perceived this gave much more force to the water, and made an improvement on this by constructing a square tapering box about four feet long, with the discharge outlet two inches square, nailing the hose on to the large end. This worked well. We could wash off a cave with this contrivance in half the time required in the old way with shovels.

About this time there was talk of great improvements having been made in placer mining about Nevada City. I made a trip over there to see if I could get a clue to any of their improvements.

All that I saw that was new to me was: A man by the name of Laird (I think that's the name) had about 50 men employed shoveling the shallow surface gravel into a ditch, constructed with sufficient grade to carry off the dirt into his sluice boxes. This worked well, but would not apply to our diggings.

From Nevada City I went to Grass Valley; saw nothing new there. Thought I would have something new made, so I went to a tin shop owned by "Mc—." There were so many "Mcs" about Grass Valley at that time that I don't remember which Mc it was. Well, the Mc I have reference to owned a hardware store and tin shop. I got him to make me a sheet iron discharge pipe about four feet long for a six-inch hose, with 2-inch discharge outlet.

On my return to Indiana Hill, I substituted the iron pipe in place of the wooden one, and made a great improvement by adding about 20 feet more pressure. I constructed a frame in a pine tree near the bank, on which I set a barrel and made a taper to the hose so as to nail it on the lower end of the barrel; a few boxes from the ditch to convey the water into the barrel and the rig was complete. We turned the water on, and to the surprise and disappointment of some who termed it "boys' play," and who a few years later considered themselves the biggest hydraulic miners about the diggings, it worked like a charm. The gravel in our claims was soft and easily piped, but when the gravel was piped out, the bank presented a face of big rotten boulders that required the pick and bar to remove, which was somewhat dangerous in this kind of ma-

terial, a cave frequently coming down without warning.

To avoid any serious accident, the use of the pipe was discontinued in the bank, but for washing off the dirt after getting down a cave it was successfully used until our claims were worked out. One man handled the pipe and all the others had to do was to remove the boulders, which we found to be a great saving of labor and time.

Some of the company objected to using the pipe on account, they said, of the quantity and force of the water carrying off the gold, but after a few cleanups they withdrew their objections.

I did not then, neither do I now, consider this in the light of an invention. I had worked with a rocker in the rich, shallow diggings where there was but little dirt to handle—had worked shoveling into the long-tom, in banks of the canyon, and worked with the pick undermining the bank for a cave in the deeper deposits in ground-sluicing. Now I had merely substituted the pipe for the pick in the same process. It was only adapting the methods to suit the conditions.

One process seems about as complete in its line as the others. It is only on this line of reasoning that I can account for so many different claimants to the original invention of the hydraulic. Under like circumstances, a score of miners in separate localities probably worked right along up into this improved process about in the same way that I did. Considering the limited intercourse between the miners at this time, this view appears to be sustained.

The miners in one camp, intent on working their claims in their own way, knew nothing, and cared less, about what was being done in other camps.

Forty years have wrought many wonderful changes. In no place is the change more conspicuous than on the gravel range from Indiana Hill to Dutch Flat. There was no Dutch Flat town—a few miners' cabins, a log storehouse where the miners got their necessary supplies of groceries, pork, beans and whisky. The town of Gold Run was not dreamed of. Forty years ago the millions of gold in this gravel range was covered by a dense forest from the North Fork to Bear river. The first evidences of the destruction of this forest were to be seen on the line of the Indiana ditch from Canyon Creek to Indiana Hill, where we had cut a few poles and trees to fix up our camps. [This was the second ditch on record in Placer county, the Bear River ditch to Auburn being the first.] We completed our ditch, got the water onto our claims at Indiana Hill, and opened them in good shape. From the pay we were getting here and the developments being made on the Bear River side, and the prospect in fine gold that could be got all along the gravel range on the surface, I was confident that a vast amount of gold lay there idle awaiting the development of some method to get it out and put it into active service. The question was, how could a sufficient quantity of gravel be run off and the fine gold saved to make it pay. Miners in those days were not "built" to give up nor stand still. We formed a small company to attack the deep gravel deposit, about one mile north from Indiana Hill. The location was on a point between two ravines that run into Canyon Creek, and was called Dubuque Hill. The members of the company were O. Harkness, G. Richie, myself, and a few others whose names I have forgotten.

We set up our rig, had about 75 feet pressure, and got a discharge pipe from Sacramento, such as are used on fire engines. It worked very nicely, but not very strongly. The gravel was pretty hard and there was too much of it. As a financial scheme, the experiment proved to be a failure.

After this, several small rigs were put up in several places on the flats at the head of small ravines, washing off from 5 to 20 feet in depth of the top soil and fine gravel, some of which paid well.

Just how and when the term of "hydraulic mining" was first applied to this process here I have no recollection. I think it was probably an imported term from other diggings. We called it ground sluicing for some time after the pipe replaced the pick, albeit the term is significant and has come to stay.

From these small beginnings, step after step improvements were made, iron pipe and the water-box replacing the canvass hose. Then comes the monitor and giant, true inventions, the results of the inventive genius of California miners. Many of the old actors have slipped from the walk-board and been carried down the flume and over the dump, but some of the "old boys" are still here to establish the truth of this narrative in regard to the early history of the now noted hydraulic mines of Gold Run and Dutch Flat. Next! J. F. TALBOTT.

A Plan to Get Rid of Debris.

STOCKTON, Jan. 18, 1892.

TO THE EDITOR:—I would like to present for consideration a plan by which our mines now lying idle can be worked and not fill up the rivers and endanger the valleys by flooding them with the debris from the mines. I will accomplish three great and valuable results to our State. First, to mine by the use of water, called hydraulic mining, the vast bodies of gravel. Second, I would furnish an unlimited amount of water to be used for irrigation, making the foothill lands of great value for homes for millions of people. Third, I would retain the debris in waste places, making valuable lands of the same, now worth nothing. The following plan I respectfully submit, believing it original and the only plan by which the results mentioned can be attained. My plan is the following: To put in the river just under where the flow of water and debris would enter the river a permanent dam. Cut a channel north and south that would carry the flow of the waters of the rivers, other than at flood-time, say one-half of the year; these channels carried at such a distance as might be needed, all the water that might be needed or used for irrigation could be used anywhere under this channel; wherever used it would leave the debris on the ground to mix with the land and enrich the same. Any one familiar with the foothills knows that everywhere, as often as every mile, are ravines to drain the same. Every one knows there is no end of the waste places in which a dam could be placed across to retain the debris from the mines, as well as the natural wearing down of the mountains, and in these waste places or valleys to make thousands of acres of the best and most fertile land. I believe, that land could be really made, so to speak, the value of which would pay the expense, or a long way toward the same. The writer has seen thousands of acres of land sold in San Bernardino county, with water on the same, for from three to seven hundred dollars per acre, and the same land not nearly as good as the made land I have mentioned, and in a climate which will mature all semitropical fruits as perfect as in any county in Southern California. With such a system for the foothill lands of Butte, Yuba, Placer, Nevada, El Dorado, and Sacramento counties, one could hardly imagine the immense value it would make of them. One could hardly imagine the possibilities to make homes for millions of people.

There is room enough to deposit the debris of the mines to work them for 100 years. Of course we could not pipe the debris into the rivers at flood time. Whether this plan is original or not, I do not know; I have never heard it advanced. I have given it a great deal of thought. We cannot retain the debris in the river channels by dams; there is not room enough. We cannot flow them into the tule lands for the want of grade to carry them there. We cannot pipe them under pressure, for the sand and debris would wear out the iron in the pipes too quick. In my mind, there is no other plan to work the mines and not destroy the valleys and the rivers. The writer has seen, in Butte county, wheat grown on debris land flowed in from the Cherokee mines that yielded 50 bushels to the acre. As an evidence of the value of debris land for fruit, let them see the orchards now coming into bearing just below Oroville on the Feather river. The soil is one-half stone or gravel, which grows the sweetest oranges.

Hoping I have given a new thought, and that the result of the labors of the convention may develop some plan by which the vast treasures can be taken from the hills, and so doing not disturb any other interest in our State, I am very respectfully,

F. A. HILL.

The Brea Mines.

The *Herald* has alluded to the recent discovery of a large deposit of petroleum products near the city's west limits. It is called a discovery, which it is in fact, although the surface indications have been known for more than a century. The company owning the lands has been busy doing developing work the past week, with most gratifying results. A shaft was sunk on the hill, which gave a surprise in the shape of a ledge of bituminous rock, fully equal to the best from San Luis Obispo.

On the face of the bluff a cut about fifty feet was made. Every stroke of the pick has been in brea. Saturday another fine vein of asphalt was uncovered. On Saturday afternoon a big blast was fired, which loosened a good many tons of the hill. The debris was all brea—black and brown.

The asphalt vein was enlarged, and a small stream of oil commenced to flow out of the face of the bluff. This week the com-

pany will put their cheap fuel on the market. Those who wish to see one of the curiosities of Los Angeles, and at the same time witness an energetic development of its natural resources, should not fail to take a trip to the brea mine. It is just a quarter of a mile west of Westlake Park, and is reached by either the cable or electric cars.—Los Angeles Herald.

Smelting and Refining.

The great works of the Consolidated Kansas City Smelting and Refining Company at Kansas City, says the *Deadwood Pioneer*, which are among the largest works of the kind in the world, have experienced a year of healthy activity and of general prosperity. The output of this immense institution for the past 12 months is about 15 per cent larger than during the previous year, being approximately 25,000 ounces of gold, 8,780,000 ounces of silver and about 50,000,000 pounds of lead. In the handling of this vast business, there has been a contribution to the resources of Uncle Sam on account of tax on lead ores of about \$350,000 or over \$400,000 since the McKinley bill took effect. On the whole, the year has been quite satisfactory, this enormous tax paid being offset by increased margins on dry ores of the United States, and while profits are not up to expectations, yet business is being adjusted to the changed conditions.

The works of the Consolidated Smelting and Refining Works, built about ten years ago, are among the largest, if not the largest in the world. The smelting grounds contain 18 acres. Six acres, or one-third of this tract, is covered with buildings. Every day, when working under favorable conditions, it handles about 40 carloads of material, including fuel, flux, ore and other articles. The works have a capacity for handling about 23,000 tons per annum. The total refining capacity reaches the enormous amount of 50,000 tons of lead and 20,000,000 ounces of silver. The silver contains a quantity of gold. These ingredients have not been separated heretofore, being sent to the Government Mint for treatment; but the company has built a large separating plant to separate gold from silver, and now produces fine gold, fine silver, refined lead, and in 60 days will have a copper plant completed.

The copper plant which is now being built covers an area of 100x150 feet, and has cost to date over \$100,000. It will have a capacity of 400 tons of fine copper monthly.

Since the smelting works were built their operation has been attended with great success, the extensive business transacted by the company and the regular employment furnished mechanics and laborers at high wages, has established one of the greatest industries in the country. They are located at the natural meeting point of all the ores and smelting materials from British America to the City of Mexico.

There are five general departments of work in the six acres of buildings comprising the smelter. They are the assaying, sampling, roasting, smelting and refining. In each one of these there are numerous different processes to which the ore is subjected while being treated. In the assaying department, the value and component parts of the various ores are treated and determined. On the sampling floor the ores are mixed in the proper proportion for successful smelting. From the sampling department the ore goes to the blasting furnaces; there, with a mixture of charcoal, crushed stone, old tin cans and other smelting and fluxing ingredients, it is shoveled into the furnaces, and bullion is seen pouring out at one point into receptacles and the slag or refuse matter at another. The slag is received into bowl-shaped barrows two feet in diameter and a foot and a half deep, and taken to the slag-yard. Some valuable material remains in this. It settles to the bottom while cooling, and the part that is only fit for the ballast remains on top. The valuable portion is easily removed from the worthless portion of the cake of slag by a slight blow from a hammer. This is treated over again, while the slag is sold to the railway companies for ballast. The bullion which comes from the blast furnace contains silver, gold, lead, zinc and a few minor ingredients. This is received in molds, and when cooled each moldful is called a pig. Each pig weighs 75 pounds and is worth about \$15. The bullion is taken to the refractory department, where it is subjected to several processes which separate the gold and silver from the lead. The pigs of lead are loaded into cars at the smelter and shipped by express. This smelter produces one-fifth of all the silver and lead smelted in the United States.

Bezoar Stones.

[The following paper was read at the last meeting of the Microscopical Society by Henry G. Hanks of this city.]

Some time ago (the exact date I do not recall), Col. C. Mason Kinne of this society exhibited a concretion, labeled "Kidney Deposit From a Cow." The accompanying label bore the name of Dr. Charles W. Schoenemann of Mokelumne Hill. This curious concretion showed a metallic lustre resembling gold, which caused some discussion. It was placed in my hands for examination.

After convincing myself by a microscopical examination that the lustre was not due to the presence of any metal, much less gold, I laid it aside for further study, and for a time it passed from my mind, but lately it again attracted my attention and I determined to make an analysis of it, but on referring to authorities I found that the chemical nature of animal calculi had been so thoroughly studied that no investigation of mine would be likely to reveal anything new or different from the many analyses to be found in text books; but the research interested me and I made memoranda that I have thought might be of interest to the society.

As far back as the time of Pliny, *bilaris calculi* were used as a medicine, for that author, book 28, chapter 60, so states: "There are found in liver of the wild boar certain small stones of a white hue and resembling those found in the liver of the common swine. If these stones are pounded and taken in wine they will expel calculi, it is said."

From that time to the beginning of the present century, we read of the same use being made of them. They were known in mediæval times as "Bezoar Stones."

In the latter part of the sixteenth century, Caspari Bauhini wrote a treatise on the Bezoar stone, which was published in Latin in 1613, entitled "De Lapidis Bezoar," a copy of which I have brought this evening for your inspection. This work is not only a monograph, but the only one I find referred to by authors I have consulted.

Anselmus Boetius de Boot, 1647, and Robert Lovell, 1661, have written on this subject, but seem to have drawn freely on Bauhini. Both refer to him as authority.

Lovell states so many cures effected by the Bezoar stone that it is not surprising it was considered a panacea "against all sorts of poisons," etc., "and other malignant diseases." It is described by him as having a bad smell, being without taste, by some considered temperate, by others cold and dry; others say it works by its whole substance or occult quality.

As a medicine, it was given with "borage water," or sugar of roses; the dose was from one grain to one drachm, taken in mugwort water; conserve of maiden's hair; water of white lilies; unicorn's horn; red coral; sorrell water; brook lime water, or juice of lemons. To it was ascribed great medicinal virtues and it commanded very high prices.

Similar concretions are found in the biliary organs. It was not only the intestinal calculi that were considered as Bezoars, for Bauhini includes the "Paxar from the toad, the asp, and from the gall of the porcupine."

The Bezoar stone is described by writers as being "a hard, heavy stone, very variable and uncertain in shape, color, and in size between a horse bean and a small walnut," although there were some larger and smaller. The usual color was of a dusky olive or greenish brown, polished externally, and when broken, found to have the structure of concentric coats or shells, sometimes founded on foreign bodies, with a small stick or seed as a nucleus.

The Bezoars were then supposed to be, as now known, concretions found in the stomach, intestines, or liver of certain animals, those of Persia, presumably from the deer. The principal localities were Persia, Peru and New Spain (Mexico).

In an old volume, "A True and Impartial Journal of a voyage to the South Seas and Round the Globe in His Majesty's Ship, The Centurion, Under the Command of Commodore George Anson, London, 1745," we find a description of the bezoar stones of Peru:

"Of their wool are made very valuable mantles which never lose their color * * and in them," the vicunas and llamas, "the bezoar stones are found. Another sort of creatures, larger of body, called Tarugas, whose ears are soft and hanging down, do also breed the bezoar stones and of greater virtue." * * * "The bezoar stone is said to be found in all creatures in Peru, of which so many authors have treated that it will be sufficient to say it is found in the maw and sometimes in the stomach, sometimes only one, and sometimes two and

three together. There is much difference in the size and color, some bigger and some smaller, and the largest as large as oranges, some round, some oval, and in other shapes, as to color they are gray, black, white and gold color, but neither the color nor the size signifies anything as to the virtues. The Indians say there are abundance of venomous herbs and creatures which poison the water they drink and the pasture they feed on, and even where they tread, and that the vicuna naturally knows an herb (as do the other animals that breed the bezoar) which they eat to preserve themselves against the poison, and that the said herb breeds the stone, hence it has the virtue. This stone is good against infectious distempers, and if rightly applied, against the spotted fever and other diseases. The best bezoar stones are those of the East Indies, the next those of Peru, and the last those of New Spain. The Indians, finding the Spaniards value them, have made some artificial. There are also stones for the pleurisy for stopping blood and for the falling sickness."

Varieties of bezoar and names given to it: "Oriental," "Occidental," "Spanish Bezoar Stone," "Bezaar," "Belzaar," "Bezaar Stone," "Bezoar Microcosmum."

Besides the Oriental and Occidental, there were the mineral of Serapio, mineral of Cesalpinus, and that of "Hercules Saxonia," "The German Bezoar," "Lapiide Paxar," etc.

Bauhini gives the history as follows: The Oriental and Occidental were most prized; the former was from Persia and the latter from New Spain, Mexico or Peru.

The name is supposed to be of Persian origin, meaning expeller of poisons. It was considered an antidote for all poisons. Bezoards were composite medicines containing bezoar. It is now known that the bezoars have no medicinal properties.

The following description is by Lovell: "The oriental stone is of diverse figures, containing chaff or a hair, or the like. It is of diverse color (most commonly a blackish green), green, paleish ash, or yellowish, without smell, of diverse magnitude, but most commonly lesser than a walnut."

"Bezoar being so high priced, was often adulterated with fragments of stone and pitch or chalk, ashes of shells, and dry blood or cinnabar, antimony and quicksilver, united by the help of the fire, all of which are not only useless but hurtful to the body."

Concretions or calculi are found in many animals, and in different parts of the body. They differ according to the parts in which they are found, and to the food of the animal. In carnivorous animals they resemble those of man.

Chemists classify them into eight varieties:

1. Mainly phosphate of lime.
2. Mainly phosphate of magnesia.
3. Ammonia phosphate of magnesia.
4. Biliary.
5. Resinous.
6. Fungous.
7. Hair.
8. Ligniform.

There are numerous stories extant, legends of gold found in animals, which may have had their origin from the finding of concretions like that under consideration this evening.

Sometimes it is a fish, sometimes a bird or quadruped that becomes the treasury. As all, or nearly all, romances are founded on fact, so, as in this case, observers may have been deceived by the golden, almost metallic lustre and color of the concretions, for bezoars are frequently of a golden color as described by writers.

We find in Anson's Voyage, quoted above, that the Peruvian bezoars "were gray, black, white and GOLD COLORED."

We shall not have to go beyond the confines of California for stories of this nature. The following is an extract from the *Miner* of Alpine county, which I have on file:

"In the stomach of a cow killed at Silver mountain lately, was found gold dust of the value of over ten dollars, after panning out. The cow had run for the past two years on Wolf creek."

Another from the *Reno Gazette* of Sept., 1883, reads thus: "About an ounce of pure gold was found in the crop of a chicken killed the other day at San Diego. It was in small pieces mixed with sand and gravel."

The following, possibly a different version of the same, appeared in another paper in 1889: "In a chicken's gizzard last Thursday at Grass Valley, Matthew Mitchell of the Wisconsin Hotel found a pellet of gold worth twenty or twenty-five cents."

While the concretion exhibited this evening is certainly gold colored, and might be thought to be gold by a wholly ignorant person with a strong imagination, no California miner would for a moment be deceived.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLINTON CON.—*Ledger*, Dec. 23: This mine continues to wear a look of prosperity. Everything is kept humming, and the work of making additional improvements still goes on. In the sinking, some very high-grade ore has lately been encountered. A company's store has been built, and was opened this week; also a bar in connection therewith. The company this month paid the balance due on the McAtto property, amounting to \$7500.

PIONEER DISTRICT.—Mining in Pioneer district is decidedly on the improve. A. W. Kimball is working on his claim, with very encouraging prospects. He is down 100 feet, with a three-foot quartz vein. The ore is of unusually high grade, and shows considerable free gold to the naked eye. It is now estimated that the ore at the bottom will go as high as \$400 or \$500 per ton. W. C. Gracey is running a tunnel on the Sunny South claim. He is in a distance of between 400 and 500 feet, and has encountered the ledge, which he believes is the same struck by Garner and Emsley some years ago, which yielded \$60 per ton.

NEW YORK MINE.—W. G. Anderson, the superintendent, informs us that they have cleaned up three times at this mine, three miles southwest of Jackson. The yield each time was something over expenses. The large roller quartz mill does satisfactory work, and crushes between 20 and 30 tons per day. A force of seven men are employed at mine and mill. Mr. Anderson has just returned from San Francisco, whither he went to arrange if possible for the putting in of concentrators to save the sulphurets, of which the ore carries considerable, and they are estimated at \$50 per ton. He believes three Woodbury machines will be put in before long, which ought to place the property on a fair paying basis. It is reported that the Downs mine near Volcano is to be started up soon by a new company.

Butte.

A BIG LEDGE.—*Oroville Register*, Jan. 21: C. F. Belding informs us that the tunnel on the Shakespeare mine at Forbestown is now in 290 feet, and that the ledge is 23 feet wide. It is rich in sulphurets, and a hundred tons of ore will average about three tons of sulphurets. No work is being done at present in the Golden Queen. The Stow mill is now lighted with electricity, the dynamo being run by water power. It is thought the mine will be shortly lighted with incandescent lights from the same dynamo.

Calaveras.

RICH ROCK.—*Amador Ledger*, Jan. 23: J. O'Neil was in Jackson, Monday, showing samples of quartz taken from a claim operated by him at Whiskey Slide, Calaveras county. The rock was extracted from a depth of 90 feet, and shows plentifully of coarse gold. The ledge is narrow, not over 18 inches wide, but with a fair proportion like the sample shown us it would certainly yield a handsome profit. A test crushing was made at the Amador mill some time ago, which turned out well. O'Neil says it will average from \$8 to \$10 per ton. He has no facilities for crushing the ore.

A VALUABLE MINE.—*Mt. Echo*, Jan. 23: Prospecting is going on in the Excelsior mine, owned by J. B. Meyers, and situated in the western part of this town. Mr. Meyers showed us a large specimen of the ore, which shows free gold and carries sulphurets of a superior grade. All the mines adjoining the Excelsior, north, south, east and west, have proven valuable.

BUTTE.—These are stirring times in this section. New mills are being built, old ones renovated, new mines opened, and other improvements too numerous to mention. In fact, a spirit of enterprise seems to prevail throughout the entire community. Improvements continue at the Lane & Tulloch mine. The mine is looking first class and bids fair to be one of the largest and leading mines of the State. The mill on the Calaveras mine at Robinson's Ferry is running like clock-work. Work is going on actively in the mine also. The work of fitting up the Gold Hill mine at Smith's Flat is going on briskly. Men are employed at present grading off a foundation for the mill. Everything is running in splendid shape at the Gold Cliff mine. The mill is pounding away day and night, and the mine is making a satisfactory showing. Operations have been commenced in the Curtis mine at Smith's Flat. The Huntington centrifugal roller mill is in operation crushing ore.

Plumas.

INDIAN VALLEY.—*Plumas Bulletin*, Jan. 23: A ledge of fine ore 15 feet in width is reported to have been opened in the main tunnel of the Indian Valley mine.

NORTH FORK.—Alex. Cameron, Supt. of the Savercool mine, says the North Fork mines are all right—that considerable money will be taken out this year.

Inyo.

DARWIN DOINGS.—*Independent*, Jan. 22: At the Independence mine, a very important improvement has been completed by the introduction of water to the different parts of the mine. The mine is very dry in all its parts, and when miners were at work, the air quickly became so filled with dust as to make it very disagreeable and injurious to health. Mr. Reddy determined to remedy this by the introduction of water pipes to the various workings. This has been done, and now the men keep the ground all about them well sprinkled, and the air is free from dust, clear and pure. There is plenty of ore in sight, and teams are on the road all the time hauling to Keeler. There are

no idle miners at Darwin; if more men could be had, they would be employed at the Independence mine. The wages paid are \$3.50 a day. The Defiance mine, also owned by Mr. Reddy, is reported to be looking well with much ore in sight. At Lookout, Mr. Fitzgerald is reported to be accumulating a large amount of ore at the furnace, with intent to make a run soon.

Nevada.

GOOD ORE FROM THE HERMOSA.—*Grass Valley Telegraph*, Jan. 23: We were shown this morning some very fine ore from the shaft of the Hermosa mine. The quartz was literally filled with gold, and was of a moderately coarse nature. The ledge is from 10 to 12 inches in size, and appears to be now in a section of country where it can live. For a long time the ledge has been in and out, owing to the unsettled condition of the country; but it is now believed the ledge will remain permanently, and if such be the case, it will not be a great while before the Hermosa will be on a self-sustaining basis, and dividends will surely follow. It is the opinion of all miners, from the character of the quartz and the location of the mine, that it will be one of the best in the district. The ledge is said by those who know, to be identical in character with that from the Massachusetts Hill mine.

San Bernardino.

VICTOR.—*Times-Index*, Jan. 22: Victor is famous for its fine marble and granite quarries, which are now furnishing marble and granite for all the large cities in California. Gold and silver mines are being worked here at a large profit.

San Luis Obispo.

TO BORE FOR OIL.—*Arroyo Grande Herald*, Jan. 20: Mr. Sanford has leased certain portions of the Tar Spring Ranch to Mr. Meyer Lewis, representing a Los Angeles syndicate, which intends to commence boring for oil. The lease is for 20 years, and work is to commence within the next 60 days. One funny thing about the transaction—that is, funny to those who do not understand the scientific reasons therefor—is the fact that they did not want the level land at all, and chose the hilly promontories.

Sierra.

TELEGRAPH.—*Mt. Messenger*, Jan. 23: The prospects at the Telegraph mine continue good, the gravel looking well. In the gravel reached there is so much water that not much has yet been taken out.

MAPLE GROVE.—The contract of 25 feet has been finished in the Maple Grove tunnel, near Alleghany, and another contract, for that distance, has been let to the same party, S. J. Frazier, who, with Chris Honold, are doing good work. Hopes are entertained of striking pay gravel by May next.

Siskiyou.

ON THE KLAMATH.—*Yreka Journal*, Jan. 20: The several claims on the Klamath are still being worked, the river continuing at a low stage to permit successful operations, notwithstanding the great amount of snow on the mountains, the weather keeping just cool enough to stop it from melting until the spring season sets in.

CHINESE LUCK.—The Chinese Co., at the Bentz Bar claim, continue to realize rich pay, and may be able to work right along without pulling out, unless we have heavy rainstorms to raise the river to a high stage. This company realized about \$40,000 during 1890, and over \$100,000 during the past year, the cleanups from some of the cuts ranging from \$5000 to \$10,000 a day. Several of the company desiring to return to China last September, a division was made, the 18 members receiving \$4200 each. The gold from this claim is not as good as above, and no doubt comes from Dutch creek, as it brings only about \$15.75 an ounce, while the gold in the Kanaka and Swiss Bar claims, just above, sells at over \$17 an ounce. The Chinese sell the porous gold in this country for the most they can get, but take the solid gold to China, where they get \$20 in China money for it. The Phil Mott claim, farther down the river, is also paying handsomely, from which more gold has been taken out during the year than in any season since work was commenced in it. Work is also being carried on in several other claims along the river, and next season some of the claims lying idle last summer are to be reopened on a more extensive scale, with good prospects of success. The cold nights during the past few days have stopped the flow of water in the streams to prevent the miners from washing gravel and obtaining their usual supply of glittering ore, but the water supply will last just so much longer during the summer days by such retention.

NEVADA.

Washoe District.

CHOLLAR.—*Virginia Enterprise*, Jan. 23: The north drift from the incline station, 1500 level, is out 112 feet, face in hard porphyry. The joint west crosscut from south drift from Hale and Norcross incline, 1640 level, is out 95 feet, the last 20 feet in quartz containing bunches of \$50 ore.

WARD COMBINATION SHAFT.—The southwest drift, 1800 level, is out from the shaft 1000 feet; face in hard porphyry.

SIERRA NEVADA.—West crosscut No. 1 from the northwest drift, 630-foot level, 571 feet from the shaft, has been advanced 41 feet; total distance, 1666 feet; face hard in porphyry.

ALPHA.—The north drift from the winze, 550 level, is out 158 feet; face in quartz and porphyry. West crosscut, 70 feet south of winze, 550 level, is out 39 feet; face in quartz. The southwest drift from the Ward shaft, 1800 level, is out 1000 feet; face in porphyry.

EXCHQUER.—East crosscut, 150 feet south of north line, 600 level, is out 220 feet; face in porphyry.

SILVER HILL.—The south drift from the

Justice shaft, 490 level, is out 415 feet; face in gypsum and quartz.

NEW YORK.—Have been repairing the west drift from the shaft, 650 level. The west crosscut, No. 4, 650 level, is out 96 feet; face in porphyry.

POTOSI.—The raise from the south drift, 44 feet above the 1200 level, is up 26 feet; top in ore which assays \$35 per ton.

ANNES.—North drift from crosscut No. 4, on 420 level, was advanced 26 feet in quartz and porphyry. North drift from east crosscut No. 6 was extended 14 feet, continuing in quartz.

BULLION.—The east crosscut on north line, 1400 level, is out 110 feet; face in porphyry. The south drift from the Potosi winze station, 1500 level, is out 193 feet past our north line; face in porphyry. Have started in east crosscut 20 feet south of north line, 1500 level.

OCCIDENTAL.—The drift started north from west crosscut in south drift, on 350 level, has been extended 14 feet in fair-grade ore. The west crosscut from the north drift to connect with the winze on 450 level has intersected the winze level from the 450 level. The drift started from the Suro tunnel has been extended during the week 29 feet; total length, 245 feet.

UTAH.—The northeast drift from the main west drift, 725 level, started at a point 180 feet west from the shaft station, has been extended 49 feet; total length, 102 feet, continuing in porphyry and clay formation.

CONS. CAL. AND VIRGINIA.—There has been extracted from all parts of the mine during the week 1023 1910-2000 tons of ore, which was shipped to the Morgan mill. The average assay value of all the ore worked at that mill during the week (980 tons) was \$31.47 per ton. Bullion shipped to Carson Mint, assay value, \$15,582.28. At all points in the mine where we are extracting ore the ore has improved in quality, and this fact accounts for the increased value of the battery assays for the week.

Tuscarora District.

NAVAJO.—*Times Review*, Jan. 23: No. 1 south drift, 300-foot level, extended 10 feet. Intermediate drift below the 300-foot level extended 6 feet, showing a small vein of very rich ore. No change in the other workings.

BELLE ISLE.—No. 1 crosscut from No. 1 vein, 350-foot level, extended 15 feet. South intermediate from No. 1 winze extended 4 feet, rock very hard. A winze has been started on No. 3, 350-foot level, on rich ore.

DEL MONTE.—Second level—North raise from west drift is up 20 feet in porphyry. Upraise, east end of stopes, has been put 10 feet; ore 2 feet wide, assays \$54.

COMMONWEALTH.—Fourth level—Joint raise from south intermediate has been advanced 22 feet, good ore mixed through the vein.

NORTH COMMONWEALTH.—Hoisted 12 cars first-class ore; assays return \$390 to \$425 per ton, and 76 cars second-class; car sample assay, \$49 per ton.

NEVADA QUEEN.—Fourth level—West crosscut raise advanced 17 feet, no change. Joint raise from south intermediate advanced 22 feet, showing ore mixed through the vein matter.

Jefferson District.

GOOD ORE.—*Belmont Courier*, Jan. 22: Some of the mines that are being worked in Nye county are reported as looking well. Superintendent Oliver is finding good ore in the Salvador mine at Jefferson, and Harrison Bros. are also encountering rich ore in their mine in that district.

Grantville District.

AT WORK.—*Belmont Courier*, Jan. 22: Superintendent Mitchell is pushing the work of development with vigor in the Alexander and Brooklyn mines at Grantville, and silver ore is being hoisted to the surface.

Reveille District.

PROSPECTING.—*Belmont Courier*, Jan. 22: Prospecting is being prosecuted with energy in Reveille district and some rich ore is being sacked up.

ARIZONA.

C. O. D. MINE.—*Mohave Co. Miner*, Jan. 23: Fred Leonard, who has a lease on the 160-foot level of the C. O. D. mine, informs us that he has an 8-inch streak of good ore in sight. New hoisting machinery for the Arnold mine, Cedar district, is now on the way from San Francisco. Fourteen tons of ore is being packed out from the Berkley mine to Yucca for shipment to Kingman. The mine is showing up finely in the stopes. McMahon and Burke have a large quantity of ore stripped on the 60-foot level of the Prince George mine and will commence taking it down immediately. L. B. Austin has been appointed superintendent of the O. K. Mining Co. vice Mr. Long, resigned. The attachments against the property of the company have been released, and the mine and mill will be started up as soon as possible. Very flattering reports from all sections of Mohave county reach the ear in regard to mines and mining. Every one who knows the difference between chloride of assessment and chloride of gold are either already in the prospecting field or are preparing to go. The recent gold excitement in the Chimbueva mountains has given every one the gold fever, and many old prospectors in Kingman are getting ready and going to the scene of the excitement. This year seems to be the commencement of a mining boom never before experienced in the history of Arizona.

IDAHO.

ROCKY BAR.—*Elmore Bulletin*, Jan. 20: The past year was a rather quiet one with the old Rocky Bar district. Several of the good properties owned by Eastern companies lay idle most of the time, while others made no progress at all. The Elmore Co. did considerable

prospecting, and lately let a contract for sinking their shaft 200 feet farther. This work will go on the present winter, carrying the shaft down to 700 feet, after which there will be cross-cutting and the running of levels. The mill was run for a time on Elmore ore, since which it has been run to the extent of 20 stamps on Vishnu ore. The Vishnu is operated through the Elmore shaft, having been connected therewith. The Vishnu is reported to be doing well, and the mine as being in good condition.

PINE GROVE.—Some years ago Pine Grove started out with brilliant prospects, and for a time was quite lively. Unfortunately, inexperienced men and companies got control of the gold and silver lodes and not only made errors in mining, but, worst of all, put in machinery for the free-milling of gold ores, when that class of machinery and process was not what was required. This mistake of course resulted in failure, and the tying up of the properties in such a manner as to keep others out. This condition of affairs, far too common to new mining camps, has about had its run, and now the district has begun to revive.

LOWER CALIFORNIA.

LA FORTUNA.—*Lower Californian*, Jan. 23: Frank Osborne, the veteran prospector, arrived in town Saturday from Tanama and other points on the Peninsula north of Ensenada. When interviewed by a reporter, he said: "I went to Tanama, on October 6th, as foreman, to assist in getting ready the works of La Fortuna gold mine, timbering up the main shaft and erecting buildings, hoisting works, etc. Quite a large amount of ore, and of a high grade, has been taken out since and very easily reduced, owing to its soft nature. The mine has good hoisting and pumping works, etc. The mill is a new one, improved by patents secured by Col. Lane, and its rollers get through about 15 tons per day."

MONTANA.

RISEING SUN.—*Tuolumne Independent*, Jan. 23: The Sonora Consolidated, also known as the Rising Sun, near Cherokee, has been idle since water gave out last November. Work was commenced Monday pumping out the water, and ore will be taken out again shortly. The ore goes about \$15 per ton. There is a 10-stamp mill at the mine.

NEW MEXICO.

VIOLA.—*Silver City Enterprise*, Jan. 23: The Viola mine at Pyramid has started up. Only a small force is being employed just now, but it will be increased in the near future. A large amount of ore is on hand, and the mill is kept running steadily. James Woodward, the well known mining man, is getting machinery in shape on the Livingstone mine, in the Burro mountains. The mine is owned and controlled by Mr. O. Bailey and friends. In doing the assessment during December last year and the first of this year, a fine body of high grade gold ore was struck in the Pennsylvania mine at Carlisle. The Peerless mine, which a few years ago gave such flattering promise of becoming a big bonanza, has now passed into other hands. The assessment work was not done on it last year, and it has been relocated by M. W. Twomey, under the name of Lillian.

OREGON.

WILL SOON STRIKE PAY DIRT.—*Bedrock Democrat*, Jan. 22: The pumping out of the shafts at the Virtue mine is being successfully accomplished, and Supt. Oliver says that only a few days remain before the mine will be free of water and the ore veins in the different levels exposed to view. Great hopes are entertained that the richness and extent of ore are all that has been claimed, and if so, the company, of which Mr. Oliver is the manager, will set about the operation of the Virtue on an extensive scale.

UTAH.

ANCHOR.—*Park Record*, Jan. 23: Thursday midnight the Anchor concentrator closed down for the purpose of putting in the new 16,000-pound rock breaker and to generally overhaul and repair the entire works. When operations are again resumed, which will be in a week or ten days, the output of the concentrator will be largely increased. Its present daily capacity is from 120 to 135 tons of crude ore, but when it again starts up, it is expected that 150 to 175 tons will be easily handled, and that, too, with a force of seven less men than are at present required to do the work.

THE SILVER KING.—There was considerable talk on the streets this week to the effect that the bond held on the Silver King by David Keith and others would soon be taken up. The Record man got hold of the rumor and at once made a visit to John Farish and asked him in regard to the truth or falsity of the report. Mr. Farish said there was nothing in it whatever; that the report probably grew out of the fact that the time for taking up the bond had recently been extended. The extension asked, he said, was reasonable, as Mr. Keith and associates had expended considerable money and time in the development of the property.

THE WEST ONTARIO.—Active operations were begun again this week at the West Ontario and a force of men is now at work extending the old crosscut on the 400 level to the ledge. The work is being done under the supervision of W. J. Wilson.

A POINT OF INTEREST.—Considerable interest is being manifested at the present time over a large body of ground surrounding the Kerr group of claims, and as a consequence a couple of tunnels are being driven to locate the apex to a vein of rich ore known to exist beneath the hill.

Adopted by the Executive Committee Jan. 22d, 1897.

MECHANICAL PROGRESS.

Condition of the Iron Business.

The condition of the iron business is an excellent criterion whereby to draw conclusions in regard to the general business of the country. During the past year a large amount of iron of every description has been made and has found a ready market. But present indications are to the effect that iron will be in still greater demand during the current year, at fairly remunerative prices. Both makers and dealers concur in this prognostic, and unless all past experience fails, the general business of the country will share in prosperity with the iron interest.

Official figures show that the value of cutlery imported in 1890 was less than half the value of that imported during 1891, while the consumption, according to all indications, has increased. This may be regarded as an evidence of the healthy influence of protection to home industry, especially since such protection gives no indication of any advance in prices.

Some lines of small hardware, especially such as is used by builders, were slow of sale the past year, in consequence of restricted building operations, brought about by the general depression of business. Nails, which are not subject to foreign competition, have never been so low as at present. The margins of profit in this line have been very small, and, in some instances, have altogether disappeared. Wire nails are rapidly gaining in use, at a considerable advance over cut nails.

There is an increased demand for some classes of small hardware for export. The same may be said of some classes of machinery. Foreign orders for locomotives are still coming in. Two $7\frac{1}{2}$ -ton locomotives have been ordered from an Eastern house for South America. A cable order has been received by the same house, from London, for two dummy engines of 15 tons weight, to go to Paraguay for use on a suburban street railway.

Railway car wheels are just now receiving marked attention. The contracting chill wheel is rapidly taking the place of the ordinary cast wheel. The more nearly perfect cylindrical shape, which is possible with the chill wheel, forms an important factor in its growing favor, especially for passenger cars. The additional cost is so trifling, it is thought that most of the users of cast iron wheels will soon very generally order the chill wheel.

A NEW SAW FOR LUMBER.—Improved methods for cutting lumber appear to be attracting much attention just now. In our last issue attention was called to an entirely new device for cutting as a substitute for sawing. We here present something new in the way of sawing, which it is thought will compete successfully with the hand saw. The device, according to the *Lumber Trade Journal*, consists of an upright saw, something like the old mule saw, only that it is thin like a hand saw, and has direct steam attachment. At each end of the saw is a steam cylinder, each cylinder having but a single steam port. The upper piston head draws the saw and the lower piston up, and the lower piston draws the saw and the upper piston down, each piston *drawing* the saw, but neither *pushing* it. This causes the saw at all times to be rigid, so that a very thin saw can be used. Below the lower cylinder are a pair of heavy balance wheels, which give a steady and even motion to the saw. To these balance wheels are connected a pair of rods, the upper ends of which connect with a knuckle joint at the lower end of the saw. This throws the lower end of the saw out as it is going up, and against the log as it is coming down. The log carriage is operated by the same engine that runs the saw, and is under perfect control by the sawyer. The inventor says: "There is no doubt but it will be a desirable mill for certain purposes. However, I should prefer not to make too much of it until I have fully demonstrated its value in a practical way."

PRIVATE VS. GOVERNMENT CONTRACTORS.—It will be recollected that much feeling has of late been manifested in English military circles on account of the imperfect make of sword bayonets at the Government works. This feeling was started at the time of the unfortunate Soudan campaign, in consequence of the disastrous failure of the bayonets employed at that time. Because of that English journals are talking about a new industry which has recently been developed at Sheffield—namely, the manufacture of sword bayonets for the British Government. Three or four years ago, no private firm in England manufactured

sword bayonets. They either came from the Government factory at Enfield or else from abroad. Some idea of the severity of the tests imposed will be gathered when it is stated that from 50 to 100 gauges are required in the various processes, before the finished bayonet receives the official mark of the War Office.

AT THE UNION IRON WORKS.—The first rivet was recently driven in the line of battle ship Oregon at the Union Iron Works in this city. The Oregon will be a sister vessel to the Massachusetts and Indiana. Each is what is technically known as a sea-going coast line of battle ships, and each will be of 10,200 tons displacement, 348 feet in length between perpendiculars, with a mean draught of 24 feet. Their armaments consist of four 13-inch, eight 8-inch and four 6-inch breech-loading rifles, in addition to a second battery of 28 pieces, namely, 20 six-pound and 6 one pound rapid fire guns and two gatlings. Each vessel will also be fitted with six torpedo tubes. The armor will be very heavy—18 inches thick above and 4 1-2 below the water line. The turrets for the 13-inch guns will be protected by 17-inch armor plates. Among other vessels now in course of construction at the Union Iron Works is a steamer for the Pacific Mail Steamship Company. She will be 345 feet long, will have 50 feet beam, and her tonnage will be 3550. The keel of the new craft has been laid, and a portion of her side-framing erected. Her engines have already been constructed.

PUNCHING STEEL.—Mr. F. H. Lewis of the Engineers' Club of Philadelphia recently read before that organization a very interesting paper on the proper limit of thickness to steel which may be punched. The thicker the steel, the greater the damage caused by punching. Recent tests to determine this matter indicate that punching injures steel less than iron up to, say, three-quarters of an inch in thickness, at which point the two materials are about equal in this respect. Beyond this point, the value of steel after punching decreases quite rapidly as the thickness increases. In iron, the percentage seems to be much more constant. The character of the fracture after punching, is also materially affected by the thickness of the material. Mr. Lewis proposes to limit to one-half inch the thickness of material subjected to punching, except that in girders over 50 feet long it may be nine-sixteenths of an inch; in top chords and end posts, five-eighths of an inch, and in shoes, pedestals and headplates, three-quarters of an inch.

STEEL-MAKING IN CHINA.—A large steel-producing plant for the Celestial Empire is at the present moment on its way to China, after being constructed by an English company at Middlesbrough. It forms a complete Bessemer plant, and the entire machinery for a large rail mill, as well as for plate and bar iron. Twenty puddling furnaces are also contained in the plant and two large blast furnaces, capable of producing 100 tons of pig iron per day. China is fast placing herself in a condition of independence of all "outside barbarians" for material for use both in peace and war. At the rate of improvements in progress in that country, China will soon become one of the most powerful nations on the globe. The senseless opposition of the common people to outside improvements is fast giving way to the inevitable. The governing classes have long seen and recognized the advantage and importance of putting their country in the van of universal progress.

THE USE OF OLD RAILS IN INDIA.—It has been quite a study of late to find a profitable use for old iron rails, which are rapidly being thrown aside, in consequence of their dangerous wear, or while their place is being supplied by steel rails. Railway engineers in India have found an entirely new use for such rails, by utilizing them for telegraph poles. For that purpose they have been found to be very effective and both cheap and durable. An extra piece of rail is held to the lower extremity of the full length rail in order to counteract its top weight. This end, of course, is buried in the ground. The brackets for these posts are of wrought angle iron. They are said to present a very neat appearance, and keep the wires well in place and apart—even during the heaviest winds.

A NEW BEARING MATERIAL.—German engineers are said to be adopting a new lining for bearings, composed of compressed vegetable parchment. When lubricated with an emulsion of mineral oil and water, the parchment becomes impregnated with the oil and will last for a considerable time.

SCIENTIFIC PROGRESS.

Electricity in Relation to Science.

Speaking at the annual dinner of the British Institution of Electrical Engineers on Nov. 13th, the president, Prof. William Crookes, said that they had happily outgrown the preposterous notion that research in any department of science was mere waste of time. It was now generally admitted that pure science, irrespective of practical applications, benefited both the investigator himself and greatly enriched the community. They knew little as yet concerning the mighty agency of electricity. Substantialists told him it was a kind of matter. Others viewed it not as matter, but as a form of energy. Others, again, rejected both those views. High authorities could not even yet agree whether we had one electricity or two opposite electricities. The light which the study of electricity threw upon a variety of chemical phenomena could not be overlooked. The facts of electrolysis were by no means either completely detected or coordinated. They pointed to the great probability that electricity was atomic, that an electrical atom was as definite a quantity as a chemical atom. It had been computed that in a single cubic foot of the ether which filled all space there were locked up 10,000 foot tons of energy which had hitherto escaped notice. To unlock this boundless store and subdue it to the service of man was a task which awaited the electrician of the future.

The latest researches gave well-founded hopes that this vast storehouse of power was not hopelessly inaccessible. Up to the present time they had been acquainted with only a very narrow range of ethereal vibrations; but the researches of Lodge in England and Hertz in Germany gave an almost infinite range of ethereal vibrations or electrical rays from wave lengths of thousands of miles down to a few feet.

Here was unfolded a new and astonishing universe—one which it was hard to conceive should be powerless to transmit and impart intelligence. Experimentalists were reducing the wave lengths of the electrical rays. With every diminution in size of the apparatus the wave lengths got shorter, and could they construct Leyden jars of molecular dimensions, the rays might fall within the narrow limits of visibility. They did not yet know how the molecule could be got to act as a Leyden jar, yet it was not improbable that the discontinuous phosphorescent light emitted from certain of the rare earths, when excited by a high-tension current in a high vacuum, was really an artificial production of electrical rays, sufficiently short to affect the organs of sight. If such a light could be produced more easily and more regularly, it would be far more economical than light from a flame or from the arc.

By means of currents alternating with very high frequency, Professor Nikola Tesla had succeeded in passing, by induction through the glass of a lamp, energy sufficient to keep a filament in a state of incandescence without the use of connecting wires. He had even lighted a room by producing in it such a condition that an illuminating appliance might be placed anywhere and lighted without being electrically connected with anything. He suspended two sheets of metal, each connected with one of the terminals of the coil. If an exhausted tube was carried anywhere between these sheets, and placed anywhere, it remained always luminous. The extent to which this method of illumination might be practically available, experiment alone could decide.

From Tesla's researches, it appeared that a true flame could now be produced without chemical aid—a flame which yielded light and heat without the consumption of material and without any chemical process. To this end, they required improved methods for producing excessively frequent alternations and enormous potentials. Would they be able to attain these by tapping the ether? If so, they might view the prospective exhaustion of coal fields with indifference; they would at once solve the smoke question, and thus dissolve all possible coal rings. Electricity seemed destined to annex the whole field, not merely of optics, but probably also of thermotics.

Another tempting field for research, scarcely yet attacked by pioneers, awaited exploration. He alluded to the mutual action of electricity and life. No sound man of science endorsed the assertion that "electricity is life," nor could they even venture to speak of life as one of the varieties or manifestations of energy. Nevertheless electricity had an important influence upon vital phenomena, and was in turn set in action by the living being—animal or vegetable. In the study of such facts and

such relations, the scientific electrician had before him an almost infinite field of inquiry. The slower vibrations to which he had referred revealed the bewildering possibility of telegraphy without wires, posts, cables, or any of our present costly appliances.

Is the Sun a Magnet?

About 70 years ago, Oersted of Copenhagen found that when a galvanic battery was passed along a wire parallel to a magnetic needle, the latter tended to deflect so as to form right angles with the direction of the wire. This discovery formed the foundation of the art of telegraphy, and also the ground for a tenable theory in regard to the earth's magnetism. It was agreed that the solar rays falling upon the earth carry with them electric force which passes around the earth's surface in a direction parallel with the equator, and as our planet turns on its axis daily, that this is the force which causes the magnetic needle to point approximately north and south.

This idea has not been materially improved upon in the last half century, though in the course of that time several persons have laid claim to the discovery that the sun is a huge magnet, and found fault with the world for not hailing them as benefactors of the race. Scientific observations of the sun have, however, furnished a great deal of material for sustaining the theory, and explaining some of the phenomena of changes otherwise inexplicable. It has been found that unusual disturbances on the solar surface, whether in the shape of big black spots which are depressions, or eruptive prominences, are followed by deflections of the needle, making what are known as magnetic storms, and that there is at least some connection between them and displays of the aurora borealis.

Some two years ago, Professor Bigelow of Washington undertook a series of investigations into the directions of the lines of force in the solar corona, that brilliant entourage of the sun which is witnessed only during a total solar eclipse. The results of his measurements and mathematical analysis, tend to prove that the lines referred to are identical in direction with those in the field of a terrestrial magnet, the rotation of the earth corresponding to the movement in the electricity-inducing dynamo. The parallel is also found to account closely for the well known daily oscillation of the needle in the absence of magnetic storms, the effect varying at any particular spot on the surface as it approaches the sun during the morning hours, and then recedes from him in the afternoon. If the earth were stationary, the radiant force would be felt immediately, but owing to its rotation there is a lag of about 23 degrees of an arc or an hour and a half of time. On this point observation and the mathematics agree, and it is found that along the resulting curve in the lines of solar force, the light and heat pass outward from the sun while the magnetic force is directed inward.

An important theoretic deduction from these comparisons is that the sun acts magnetically upon the earth through the medium of interstellar ether, the earth reacts upon the moon in a similar manner, and by this will probably be explained certain movements of the lunar nodes which are not satisfactorily accounted for by the theory of gravitation, as well as part of the perihelion motion in the orbit of the planet Mercury. Still another curious point has been brought out, and this settled instead of being simply raised for solution. It is the rate of rotation of the sun near his poles, which has long been known to be slower than near the equator. The coronal pole being found to be about $4\frac{1}{2}$ degrees away from the poles of rotation, it has been found that the former rotates once in 27 days, 9 hours, 52 minutes and 52 seconds.

The results of this study are accepted as valuable by several leading astronomers in this country. An effort will be made to extend the observations, and in particular to examine the relations between magnetism and the weather, for which purpose improved magnetic charts will be supplied to navigators, and arrangements made for systematic observations at land observatories. If the theory be substantiated, it may result in a wide extension of human knowledge of the relations of worlds to each other, and in a better understanding of "the Newtonian Potential Function in the case of repulsion."—Exchange.

ELECTRICITY AND THE TIDES.—A Canadian electrician claims that electricity causes the tides, and demonstrates it by electrifying a rubber comb by rubbing it through the hair, and then drawing it over the top of a glass filled with water, the result being that a tidal wave follows the comb.

GOOD HEALTH.

The Keeley Cure for Dipsomania.

A Pacific Coast Branch Established at Los Gatos.

THE MINING AND SCIENTIFIC PRESS, if we are not mistaken, was the first journal in California to call attention to the great value of the "Keeley Cure" for dipsomania, which is now attracting much attention in all parts of the country. Yet, notwithstanding the cumulative evidence of its value, it is still regarded as of little importance by many. The medical profession especially seem to place but little confidence in it. One of their writers, speaking of Dr. Keeley's and other specifics for alcoholism, says: "All this notoriety about specifics is the veriest trash, and will soon pass away as one of the day's wonders." But the people at large, and most of the secular press, are disposed to regard it as a great boon to humanity, although many sad failures are from time to time reported. So far as can be learned, from 85 to 90 per cent of all who take the treatment receive perfect and permanent benefit. The doctor claims that 95 per cent are cured. It is an unfortunate circumstance in the history of medical practice that no treatment of disease is successful in all cases.

THE MATTER AND METHOD OF TREATMENT

Is as follows: The patient is first provided with a bottle of his favorite liquor and told to partake of it freely, and when satiety provokes disgust the doctor commences his regular treatment, which consists first in giving a hypodermic injection of a preparation, the name or nature of which has not yet been given to the public, but which the doctor explains to his patients is intended for a "bracer" and which he says also regulates the effects of the chloride of gold which is taken internally. The mode of preparing this last is also unknown to the world, as it is not a simple chloride of gold, but compounded with other ingredients. The patient after receiving his hypodermic injection is given a bottle of the chloride, which he is instructed to take once every two hours during the day, at his room or wherever he may be. He is also instructed to visit the doctor's office four times a day to receive a hypodermic injection. When this service is performed the patients are required to form in single column with bared arms and pass before the doctor or one of his assistants for treatment. The amount of the injection varies with the condition of the patient, as shown by the tongue and pulse. The primary object is to increase the temperature of the body by accelerating the pulse. The effect is instantaneous. The general effect of the treatment is an almost total obliteration of the appetite, a quieting of brain action—in short, giving the entire system a complete rest, or rather state of lassitude. A dislike for any kind of alcoholic drink is also set up within three or four days.

TREATMENTS FOR OTHER DISEASES AND HABITS.

Dr. Keeley also treats patients for the opium and morphine habit; for the excessive use of tobacco, especially cigarette smoking; also for neurasthenia, a peculiar nervous weakness. Each of these habits receive the same general treatment as for dipsomania, but with menstrooms somewhat modified and carrying different chemicals, suited to each particular case.

THE USE OF A SOLUTION OF GOLD

For the treatment of disease is nothing new. It was in vogue some five centuries ago, and known as *aurum potable*, and was chiefly employed as a tonic and was by many regarded as a restorer of youth—an elixir of life. It is also used at the present day, but Dr. Keeley seems to have been the first to employ it as a specific for drunkenness.

IT IS A SECRET REMEDY,

And it is chiefly for that reason that the medical faculty, as already stated, takes but little interest in the matter. It is held by the profession as a fundamental principle that they shall not take any notice of, or hold any communication with, any person who employs any secret remedy. This practice may have some reason in it; but the evidence is cumulative that it costs the world many thousands of lives every year, a hundred times as many as are saved by adhering to it. It is, moreover, well known that many really valuable medical remedies have been brought to light by persons not enrolled as members of the profession in any of its branches, and who totally ignore all medical rules. Many maladies once thought incurable by the faculty are cured to-day by remedies not first introduced by professionals.

The rule may have a small value; but hu-

manity would be immensely benefited by its total abrogation. Science marches triumphantly over many of the ancient landmarks of professional ignorance and prejudice, and good common sense often wins victories over maladies which our professionals of to-day pronounce incurable. It would be far more humane to seek for and utilize truth, wherever found, than to build barricades around it and compel it to come in through prescribed gates or stay out altogether. In this respect, the medical faculty is far behind the age, and is daily losing the good will and respect of progressive men and women. Does Keeley cure? That he does cure fully 85 per cent of those who come to him goes without saying; but there are those who derive but little or no benefit from his practice. In fact, there are

THREE KINDS OF CASES WHICH KEELEY CANNOT CURE,

And which have been stated as follows: "There is the wealthy class who go to him and think they are cured, and then they find themselves out of business. They have no intellectual pursuits and no longer see the enjoyments of the race course or the club, so that in some instances they have resumed the old habits. Another class is composed of those afflicted with a species of insanity. They are usually intellectually brilliant, or have been, but there is scarcely enough brain force left to build upon in an effort to change their mode of life. A third class is the thoughtless young man or boy, who usually belongs to the wealthy class, and is there, as he says, to 'please the old man.' These look upon it as a vacation, and go away from Dwight in some instances only to return. 'I'm here again, doctor,' remarked one on his second visit. 'The boys said I could not drink, and I thought I would show them I could.' But the doctor told him to go home again; that he could not and would not waste his time on such patients."

A KEELEY INSTITUTE FOR CALIFORNIA.

So great has become the popularity of this cure that Dr. Keeley has begun to establish Institutes in various sections of the country for local convenience. One of these has recently been established at Los Gatos; a beautiful and healthy location six or eight miles west of San Jose, in the foothills of the inner coast range of mountains. We understand that another will soon be established in this city, where "it is useless to remark," it is greatly needed. A large number of patients is already under successful treatment at Los Gatos. The first graduate left the institution, fully entitled to graduation honors, on the 15th inst. It is stated that much joy was manifested on the occasion. The gentleman's wife and two little children went to Los Gatos, and were rejoiced to bear the patient home in triumph, "clothed and in his right mind."

We trust that such may be the result with thousands—in fact all who may be in need of such a course of treatment.

CLIMATOLOGY OF OLD AGE.—The climatology of old age may be roughly summed up as follows: Elderly people in general do well with equability and moderate warmth; they bear cold badly; they benefit by abundant sunshine. The high altitudes are very rarely suitable to them, and are usually decidedly injurious; they do best in level places, where there is abundant shelter. They may or may not benefit by the seaside or a sea voyage, but these measures cannot be recommended with at all the same confidence as in the case of children. Most of these principles become almost obvious upon a little consideration. The failing vitality, by which we mean impaired vigor of circulation, assimilation and excretion, which characterizes advanced years, and the special maladies most frequent at that time of life, such as rheumatism, cardiac disease, gout and renal affections, serve to determine the climatological problem. Moderate warmth with fair equability, abundance of sunshine with adequate shelter, and level walks, evidently meet the most obvious indications called for by these affections.

A REMEDY FOR THE GRIP.—Dr. Keely, who has met with great success in curing dipsomania at his home in Dwight, Illinois, says: "I would like to suggest a treatment for the grip which I know is nearly a specific as well as innocent. It is simply asafetida, given in four-grain pills, one pill four times a day. No man need be sick of the grip these days who will take it. For the past two years, with all my patients here, subject, of course, to such an epidemic, I had not one man go to bed from the disease. I break it up very quickly, and, in fact, cure it. If this treatment was generally known, it would save sufferers much expense and wretchedness and many useful and valuable lives." In view of the fearful suffering, and

large and increasing death record from this prevailing disease, would it not be well for some of our physicians, who are daily being called upon to prescribe for this disease, to try Dr. Keeley's prescription and report the results in some of our city papers?

ELECTRICITY.

Telegraphing by Induction.

Mr. Edison's latest electrical invention is a system of telegraphing by induction, or without the use of continuous wires between the two points. To accomplish this purpose, he secures an elevation such as will overcome the earth's curvature between the two points between which he would telegraph. An elevation of about 100 feet will overcome that curvature, say for 30 miles, in every direction.

As we understand it, a wire is charged with electricity at that elevation and conducted to the ground, from whence, by induction alone, without connecting wires, signals may be sent in any direction and picked up at as many terminal points as may be desired within the circumference of the 30 miles radius. At such heights, it is claimed that the minimum of the earth's absorption is attained, and between these heights, across uninterrupted expanse, he believes he can electrically send messages.

"If this theory is sound, and it can be reduced to practice, he will have conferred upon mankind an inestimable blessing. Ships, becoming distressed at sea, can from their topmasts send signals of distress to any other ship within a radius of 30 miles, and if the latter cannot render assistance, they can send on the signals for another 30 miles, and so on, until relief can be afforded. So, too, upon land, where a perfectly uninterrupted and high level space between high points is attainable, electrical communication will be possible without the aid of intervening wires. The possibilities of good and of convenience in such a system are almost limitless."

A scheme something like this was put forth several years ago, whether by Edison or some other person we do not now recollect, whereby it was claimed that submarine cable communication could be obtained through long distances by simply extending a wire for a few miles from the shore, and then placing on the bottom of the ocean short lengths—a few miles—of wire in the direction desired, the last length reaching from the water to the receiving station. The theory was that an impulse started from either end would pass along to the end of the first wire, and thence by induction to the next and so to the objective point. It was seriously proposed to connect this city with the Sandwich Islands by such a broken system of wires.

Electric Railway Progress.

The electric railroad from Oakland to Haywards and beyond is fast reaching out to an accomplished fact. The rails at this end of the road are rapidly being laid. The portion of the road in and near the city is being laid with ordinary girder rails such as are generally used on street railroads; but beyond the city limits, T-rails will be laid, which are now being rolled at an Eastern rolling mill, and which are expected to arrive on this coast as soon as wanted—early in February. Other parts of the work—the building of the power house, machinery, cars, etc.—are being pushed rapidly forward. The Risdon Iron Works are building the engines and boilers; the cars are in process of construction by the Carter Bros. of Newark; the motors for the cars have been built by the Thompson-Houston Company and are already on the ground; the San Francisco Bridge Company has the contract for building all the bridges—the first over San Leandro creek has already been completed. It is expected that the road will be open for traffic some time in April next.

The Los Angeles Electric Railway, according to a recent statement of Maj. A. W. Bancroft, the superintendent, has already about 40 miles in operation, and expects soon to add 35 miles more. Mr. Bancroft pronounces the road an unqualified success. The company is building a plant of sufficient capacity to operate 200 miles of road in all. The present purpose is to extend it to Santa Monica, 20 miles from Los Angeles, on the sea coast. This is probably the most extensive electric railroad system, fully entered upon, in any part of the world.

San Diego is also constructing quite a comprehensive system of electric roads, which will, in all probability, be gradually developed into quite as large an undertaking

as that at Los Angeles. Nearly all the growing representative cities of the country are looking to electricity as the coming motive power for their street and suburban roads.

The success which has attended the inauguration of the St. Paul and Minneapolis road has encouraged the Illinois Central managers to think seriously of experimentation, and in fact has led well nigh to a firm conclusion to attempt to operate a portion of their Chicago intramural and suburban transportation business by electricity. A special committee has made a careful investigation and reported that the plan is perfectly feasible. If this road succeeds in this proposed experiment, it will not be long before the company will push the experiment still farther and onward, until we shall see the swift running trains of the Illinois Central rushing over the country for hundreds of miles, or wherever steam can go, propelled by the "coming power."

ELECTRICITY FOR A GREAT FLOUR MILL.—The great success which has attended the application of electricity to the railroad between St. Paul and Minneapolis has encouraged some of the capitalists of the former city to solve the problem of manufacturing flour by the aid of "harnessed lightning." To accomplish this, the water power of St. Anthony Falls will be utilized and brought to St. Paul. If this experiment should prove successful, other mills in the twin cities will "follow suit," and quite a thorough revolution will be effected in the operations of those great power using cities. It is claimed that the steady power to be derived from the dynamo is far preferable to that derived from either water power or steam directly applied to flour mill machinery. Mr. Kingsland Smith, an experienced and practical flour manufacturer, the inventor of the roller process, which has wrought a complete revolution in this business, has been experimenting quite carefully in a practical way, for the past year, on electrically driven flour mill machinery, and has fully arrived at the above conclusion. Thus it is that history is making record from day to day of the successful introduction of new machinery and new methods by which the great field of human industry is being more successfully and more profitably worked.

ELECTRICITY IN IRON SMELTING.—Electricity has been for some time employed in the smelting furnace; but it is only until quite recently that this agent has been successfully employed for reducing pig iron into a good quality of wrought iron. This, it is claimed, has been done by Dr. Stephen H. Emmens of Emmensville, Pa. The process is simply an elaboration and adaptation of existing methods of electrical deposition, and by this means Dr. Emmens claims to be able to produce from any grade of pig iron a ductile malleable iron of almost chemical purity, which only needs washing, heating and rolling to make it equal to the best quality of Swedish iron. The inventor claims that he can produce wrought iron by this method at a lower cost than the ordinary process of puddling, and still further economy results from the use of low grades of pig iron made from ores that are too impure to be used by the existing process of conversion.

ELECTRICITY ON THE ERIE CANAL.—Electricity for transportation purposes is fast working its way into general use. There is now a movement on foot in the State of New York for applying electricity as a motive power on the great Erie canal. The idea is fast becoming very popular. The trolley system is proposed, which is much the cheapest, and would no doubt be found much cheaper than either horse or steam. A trolley system could be constructed along each bank of the canal.

A NEW ELECTRIC GAS LIGHTER has been introduced in Boston, which is entirely different from any other gas lighter. By this device, the gas is lighted by the mere turning of the gas cock in the usual manner, without the intervention of any other piece of apparatus. The key of the gas cock is thus always a true index of whether the gas is turned on or off, and thus prevents any possibility of accident by leaving unwittingly the gas turned on during the night.

At present, of course, such schemes must be considered as only dreams of a possible future. While they now appear Utopian in the highest sense, no thinking, intelligent mind of the present day will venture to pronounce them impossible of realization at some future time, when we shall have fuller knowledge of the subtle agent, upon the mere fringe of whose possibilities the greatest electrician among us is now treading.

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BUSINESS ANNOUNCEMENTS.

(NEW THIS ISSUE.)

Mining Machinery—Union Iron Works.

Mining Machinery—Atlantic Iron Works.

Concentrators—K. S. Knodgrass.

Bear Valley Irrigation Co.

See Advertising Columns.

Passing Events.

The mining men of this State have had their attention this week almost entirely absorbed by the State Mining Convention. The results are such as to please them all and to bring about a condition of affairs which is a surprise to the general public as well as to many directly concerned. The committees, which will go to Washington to appear before Congress, are agreed upon a common demand, so that good results are sure to follow.

We have, very naturally, given a great deal of space to a record of the proceedings of the convention, and the account will be found full and accurate. Our mining friends who could not be present can, by reading what we have prepared, be fully informed of all details.

The mining question in California is coming up in Congress in several forms, and it is pretty certain that some definite action will be taken during the present session.

MINE SOLD.—A syndicate of Tacoma and Seattle capitalists, represented by James F. Wardner of Fairhaven and F. W. Dunne and L. W. Getchell of Seattle, has purchased the Black Bear and War Esle mines, in Okanogan county, Washington, for \$200,000. The mines have been operated for four months with a five-stamp mill in connection, and have yielded \$35,000 billion.

The Convention.

The proceedings of the State Mining Convention were harmonious beyond expectation. The much-dreaded Sacramento delegation proved to be one of broad-minded men, above the prejudices with which they were credited. The remarks of Messrs. McClatchy, Johnson and Devlin and of Berry were such as to reassure the mining men that the valley people could be their friends as soon as assured that the miners intended in good faith to do nothing beyond the law. This assurance given, and apparent from the resolutions and memorial, the valley delegates assented to the propositions brought forward.

The convention was in many respects the most important which ever assembled in this city. The questions with which it had to deal were of such a nature as had involved a bitter controversy extending over a period of many years. The property interests were valued into the millions of dollars. Yet so well was the whole affair managed that instead of any vindictive feeling and acrimonious debate, the proceedings were harmonious to a degree.

Such a result was hardly to have been expected from the nature of the events which had gone before. Mutual concessions and sober judgment on both sides brought it about. There was nothing really for either side in further controversy. This was the first time the factions had ever come together to try and reach a conclusion; it was, in fact, the first time they had ever had a common ground on which to work.

The basis on which the whole thing rested was the report of the U. S. Engineers, appointed by Congress to examine into the debris question in California. This report showed that it was possible to work the mines without material injury to other interests, under certain conditions therein set forth.

When the antidebris people came to realize that the miners were willing to base their demands entirely on the recommendations of that report; were willing to concede that they had done damage; were willing to refrain from further operations until Congress adopted and put in force the plans of its engineers; they, then, were willing to withdraw opposition to hydraulic mining and assist the miners in getting Congress to do something which would permit the mines to work without injury to other interests.

Here, then, was something that both sides could agree upon at last, and by confining itself strictly to consideration of the subject on this basis, without any outside issues of any kind whatever, the convention met, transacted its business and adjourned, with both sides satisfied with the results.

What happier consummation could have been reached? What wiser councils could have prevailed? The miner wants the gold; the farmer wants the gold; the State wants the gold; the nation wants the gold.

And the gold is there. It is there in those gravel hills in hundreds of millions of dollars. But the miner could not legally extract it since by reason of the physical condition of the country the debris resulting from his work injured the lands and rivers. For years the gold has been locked up, and time proved the want of it to all concerned. When at last through the action of the Legislature and of Congress unprejudiced and skilled engineers came between the two factions and pointed out a way by which the gold could be mined out and no harm result such as had been complained of in the past, there was a chance to remedy in a measure the evil which had been done.

But prejudice and ill feeling still existed. How then could this be dissipated and the two sides be brought to agree upon what had been recommended to them. To a humble miner in Placer county occurred the idea of bringing these men together. The movement grew and in the end resulted in the most largely-attended and important

convention which ever met in San Francisco. The proceedings are recorded elsewhere in this number of the PRESS. The results are far beyond expectations and will be wide-reaching and important, not only to California but to the Union.

There is one man who ought to be happier than all others at this result, though his name does not appear in the proceedings of the convention. That is Marion Biggs of Butte county, ex-member of Congress. He pledged himself while in Congress to do something for the miners. It was through him that the Commission of Engineers was appointed. He introduced the bill for the appropriation to inquire into the debris question and got it passed.

It is doubtful if even he could have predicted such a result from his bill, for to the existence of that Government Commission is due the good feeling prevailing among men who have been enemies for years. With this report between them they have joined hands, and will, in the future, instead of contending with each other, fight for a common cause.

The Mining and Scientific Press.

Like any other human industry, that of mining must have an advocate which will bring before the public such measures and events as affect the business and those engaged in it.

The MINING AND SCIENTIFIC PRESS is fighting, and proposes to continue to fight, the battles of the miners of California; and it will be obliged for their cooperation and assistance in extending its circulation by their subscriptions. The advantage will be mutual, since by adding to its influence and widening its field, it will be possible for the paper to accomplish more good for those whose interests it advocates, and itself meet with better recognition.

The MINING AND SCIENTIFIC PRESS was the first journal established in the United States specially devoted to the mining industry. It not only keeps close track of current mining news of the day in the way of development, strikes, new fields, etc., thus bringing properties to public attention, but publishes the best description and notes of improved methods and metallurgical processes, with engravings and new mechanical appliances connected with mining and milling. On matters relating to the mining laws it has always been a recognized authority, publishing, explaining and commenting on the decisions and rulings of courts and departments, so that the miner could learn the legal aspects of any case at once.

It is hoped that the miners of this State will show still further appreciation of the efforts of the MINING AND SCIENTIFIC PRESS and assist in a material way in extending its circulation.

The proceedings of the State Mining Convention will be found in full in this number. From them it is apparent that a revival of the mining industry of California is at hand. The MINING AND SCIENTIFIC PRESS has taken an active part in creating an interest in this movement, and the miners of the State should offer it their assistance in order that it may still further aid in the good work.

SAN FRANCISCO has never before seen such a gathering of representative miners as appeared here during convention week. They were well received and complimented on all sides for their appearance and the intelligence with which their business was conducted.

NOTWITHSTANDING the discussion about debris dams, continued during the past ten years, it seems, after all, that these dams are to be the salvation of both miner and farmer.

A FLOOD of water broke into the No. 9 tunnel of the Sierra Buttes mine, Sierra City, this week, doing some damage to the works at the mouth of the tunnel.

The California Miners' Association.

Officers and Committees of the State Organization.

The officers of the California Miners' Association are as follows:

OFFICERS.

Hon. J. H. NEFF.....President.
W. C. RALSTON.....Secretary.
THOS. R. EVERETT.....Asst Secretary.
H. PICHOR.....Treasurer.

VICE-PRESIDENTS.

NAME.	COUNTY.
R. F. Grigsby.....	Napa
Henry Martin.....	Trinity
Geo. J. Thomas.....	Marin
Frank R. Welch.....	Sierra
Woolson Banghart.....	San Mateo
R. H. Campbell.....	Siskiyou
Jas. O'Brien.....	Yuba
Frank Fitzgerald.....	Inyo
A. B. Call.....	Amador
Dixon Brabban.....	Plumas
A. F. Ryan.....	Humboldt
Arnon Bell.....	Shasta
H. O. Harvey.....	Sacramento
D. K. Perkins.....	Butte
A. M. Hardie.....	San Luis Obispo
A. Tregidgo.....	Nevada
Ex-Gov. H. G. Blaisdell.....	Alameda
T. B. Morse.....	Calaveras
Hon. A. M. Clark.....	Fresno
J. K. Luttrell.....	Sonoma
J. J. Crawford.....	El Dorado
R. M. Folger.....	Mono
Geo. F. Hoyte.....	Orange
R. McMurray.....	San Francisco
W. S. Chapman.....	San Francisco
I. C. Stump.....	San Francisco
R. T. Lacy.....	San Francisco
A. J. Ralston.....	San Francisco
John W. Maxwell.....	Tuolumne
Hon. R. Clark.....	Colusa
C. F. Reed.....	Placer
Chas. Bogan.....	Mariposa
James H. Lawrence.....	Merced

EXECUTIVE COMMITTEE.

Hon. J. H. Neff, Placer.	H. A. McCrahey, Lake.
Louis Glass, San Francisco.	Jas. Trustad, Marin.
Col. Dan M. Buros, S. F.	R. M. Folger, Mono.
Cal. F. McLaughlin, Butte.	W. K. Aldersley, Napa.
S. K. Thornton, S. F.	Obas. Bogan, Mariposa.
Wm. Ireland Jr., S. F.	Jas. H. Lawrence, Merced.
Hon. O. W. Cross, Nevada.	Hon. J. M. Walling, Napa.
Chas. G. Yale, San Francisco.	D. G. Pixley, San Francisco.
J. B. Hobson, Placer.	John Spaulding, Placer.
Hon. Edw. Coleman, Nevada.	W. W. Kellogg, Plumas.
Hon. A. Walath, S. F.	M. M. Drew, Sacramento.
Hon. J. K. Luttrell, Sonoma.	R. G. Hart, Shasta.
Ex-Gov. H. G. Blaisdell, Alameda.	John Hays Hammond, S. F.
Hon. Jno. Daggett, Siskiyou.	N. J. Brittan, San Mateo.
Hon. E. O. Voorhes, Amador.	George M. Pinney, Sierra.
E. W. Fogg, Butte.	R. G. Hart, Shasta.
John F. Davis, Calaveras.	A. W. Daus, Sonoma.
J. H. Boggs, Colusa.	A. Howell, Stanislaus.
Hon. Thos. Frazer, El Dorado.	O. P. Berry, Sutter.
Mr. McDonald, Fresno.	M. C. McFarahan, Tuolumne.
W. H. Pratt, Humboldt.	G. C. Knaball, Tehama.
Hon. Patrick Reddy, Inyo.	John McMurray, Trinity.
J. O. Miller, Kern.	O. G. Mayo, Yuba.

FINANCE COMMITTEE.

Louis Glass, San Francisco.	Edward Coleman, Grass Valley.
Wm. Ireland Jr., S. F.	S. K. Thornton, S. F.
N. J. Brittan, San Mateo.	John Hays Hammond S. F.

COMMITTEE TO FORMULATE AND PROMOTE THE ADOPTION OF AMENDMENTS TO MINING STATUTES.

Hon. Niles Searles, of Nevada.	J. M. Fulweiler, Placer.
Hon. C. W. Cross, S. F.	H. I. Thornton, S. F.
	Hon. J. K. Luttrell, Sonoma.

COMMITTEE OF CONFERENCE WITH RIVER AND HARBOR CONVENTION COMMITTEE.

R. G. Hart, Shasta.	Wm. Ireland Jr., S. F.
Frank McLaughlin, Butte.	J. B. Hobson, Placer.
Hon. J. K. Luttrell, Sonoma.	

DELEGATES TO WASHINGTON.

Hon. O. W. Cross.	Hon. J. K. Luttrell, Alternate.
Robert McMurray.	Frank McLaughlin, Alternate.
J. B. Hobson.	Wm. Ireland Jr., Alternate.

[It has been decided that Messrs. Luttrell, McMurray and Hobson will go to Washington to present the memorial and resolutions to Congress, and confer with the committees.—EN. PRESS.]

The headquarters of the California Miners' Association have been established at room 23, No. 33¹/₂ Pine St., S. F. Stock Exchange Building.

THE CONGRESSIONAL COMMITTEE.—The following gentlemen were nominated at the meeting of the Executive Committee of the California Miners' Association, and from the list the committee to go to Washington was selected: J. H. Neff, A. W. Cross, Maj. F. McLaughlin, Robt. McMurray, J. B. Hobson, C. G. Yale, J. H. Boalt, A. Walrath, A. B. Dibble, Grove L. Johnson, J. K. Luttrell, A. J. Bowie, M. H. Mead, J. Daggett, McMurray of Plumas. It has been decided that Messrs. J. K. Luttrell, Robt. McMurray and J. B. Hobson shall form the committee.

All that remains to be done now to rehabilitate a great industry is for the miner to keep absolute good faith; to abide by the declarations of the memorial and resolutions adopted, and to vigorously urge his demands, and the press and public will continue to express the kindly feeling already manifested, and assist him in every way.

THE editorials in the Sacramento Bee coincide exactly with the expressions of one of its editors before the mining convention. It has taken the ground that hydraulic mining should be permitted to go on again, provided this can be done in the manner indicated by the Government commission.

STATE MINERS' CONVENTION.

Proceedings of a Representative Body.

The Resolutions, Memorial, Speeches, Debates, Officers and Committees.

At 2 P. M. on Wednesday, Jan. 20th, the State Miners' Convention assembled in Pioneer Hall. J. H. Neff of Placer county, chairman of the Placer County Miners' Association, which issued the call for the State Convention, called the meeting to order and announced the first business to be the election of a temporary chairman.

Judge J. M. Walling of Nevada, in nominating Mr. Neff, said: "A short time since, a few gentlemen in the county of Placer met, and as a result of that meeting has grown this as an offspring. [Applause.] They seemed to have advanced ideas which have touched the sentiment of the people of this State, and it seems to us eminently proper that the gentleman whom they selected as their chairman should be temporary chairman of this convention."

Grove L. Johnson, of Sacramento, said: "As a resident of Sacramento county, interested in this question equally with that of any other county in the State, and perhaps more so, and feeling, as I believe the people of that county do, that everything should be done by this State to make the people of this State—farmers and miners—homogeneous and united [great applause], and recognizing in the gentleman nominated by Judge Walling a man known to the people far and wide as an honest, patriotic and worthy citizen, I take great pleasure in seconding his nomination, and hope that he will be elected unanimously and that our declarations will be as unanimous as our selection of temporary chairman."

Mr. Neff was unanimously chosen, and addressed the meeting as follows:

Gentlemen of the Convention: For this distinguished honor I return to you my sincere thanks. I shall endeavor as a temporary officer to so conduct the affairs of the Convention as to be considered impartial and fair, and particularly so to our friends who come here from a distance, representing districts that are not strictly mining counties. I admonish you, my friends, to be particular regarding the resolutions you shall formulate here. We cannot afford to antagonize the farming interests of this State. There are two great contending interests in California that we want to harmonize. We want to meet in a spirit of fraternity. We want to be together on this question. In unity there is strength, and we will be enabled to accomplish something through Congress.

This Convention was not called for the purpose of nullifying any law or overriding any decision of the courts, for we consider ourselves law-abiding citizens. To our neighbors in the valleys we will say that we don't propose to cover you up with slickens; not at all. We propose to proceed under the law, and if a plan can be formulated by the commission appointed by the General Government, we propose to proceed on that plan; but, gentlemen, that will be for you to determine. I consider it a distinguished honor to preside over such a body of representative citizens. I have never, in all my experience of 40 years in California, seen a better representative body of citizens than that which I now see before me.

On motion of D. T. Cole of Sierra, W. C. Ralston of San Francisco was elected Secretary, and on motion of J. B. Hobson of Placer Thos. B. Everett of Placer and E. A. Wilsee were chosen assistants.

After some discussion it was decided that the Chair appoint a committee of 15, from as many different counties, as the Committee on Credentials.

At this point V. S. McClatchy of Sacramento rose to a question of privilege; but C. W. Cross of San Francisco raised the point that a question of privilege was not in order until the convention was permanently organized. The Chair declared the point well taken.

M. H. Meade of Sierra suggested that the Chairman of each delegation prepare a list of his delegates.

The Chair suggested that a Committee on Memorial should be appointed, to frame a memorial to Congress setting forth the facts of the conflict between the two great leading industries of the State.

James H. Laurence of Merced moved the appointment of a committee of five. J. K. Luttrell of Sonoma wanted a committee of 25. He said:

"We want every section of this State represented if possible—the agricultural as well as the mining interests. A committee of five is too small for so important a proposition. I do not believe there is a gentleman here to-day but who is in favor of renewing hydraulic mining if we can do so without injuring the farming interests. Our desire is that every industry in the State should prosper. To-day we see thousands of empty houses in the mines, millions

of dollars invested and not paying a dollar; we see the farmers of the valley seeking a market for their products, and if mining were resumed they would find a market in the mines. Therefore let every section of the State have a voice in the memorial, that we may speak to Congress in tones of thunder and tell them what we want. If we do we will have legislation that will foster and protect every industry in our State."

After some further discussion, the motion to appoint 25 was carried unanimously.

Mr. C. W. Cross of S. F. said "Mr. McClatchy of Sacramento rose to a question of privilege and I raised a point of order. I did so that the proper steps toward permanent organization might be taken, and we might get down to work. These steps having been taken, I move that the convention give Mr. McClatchy leave to address the convention out of order." This motion was carried.

MR. MCCLATCHY'S SPEECH.

Mr. V. S. McClatchy of the Sacramento Bee was called to the platform and said:

Mr. President and Gentlemen of the Convention: This is an honor which I had hardly expected—to be called to the platform. I desire to say to this convention simply this, and it is something which yesterday I had no idea of saying. It occurred to me this morning that it ought to be said, from hearing various comments that had been made upon the appearance of the Sacramento delegates. I believe that the motives of these gentlemen in coming here were misunderstood. I, as one of the publishers of the Sacramento Bee, regarded as the most rabid anti-hydraulic in the State of California, can say with good grace to you, gentlemen, what I am about to say.

They have fought a good fight—the farmers and miners—because it was fought earnestly on both sides, but there is no good reason why good fighters should not be good fellows. That war is over. He is not a good patriot who continues a war after peace has been proclaimed. Both sides fought for what they deemed to be their rights—the valley man for the protection of his orchards, his goods and his home; you, gentlemen, believed you were right to conduct the business upon which you depended for a livelihood; which you believed to be right and proper.

This question between us has been submitted to the courts. The courts have decided on the broad principle that any man can use his own so long as he does not injure the property of others. Now, gentlemen, we find from the almost unanimous expression on the part of the gentlemen engaged in hydraulic mining—and I want to say here that the valley people never had any objection to any other kind of mining save hydraulic mining, and to that only in so far as it threatened to destroy their homes—that they will not oppose the laws of the State and nation, and that they will not oppose the decrees of the courts, and we came down to say to you that we want to bridge the chasm. [Applause.]

We recognize in the mining industry one that originally made the State [Applause]. My father was a pioneer; came here to California, walked up almost bare-footed, after being shipwrecked, 800 miles, from San Diego. He was one of the founders of this State, this commonwealth, and he recognized mining as one of its industries.

Now we of the valley oppose mining only so far as it threatens to destroy our homes. Now that has passed away and we believe you will not do anything to injure us, we say that we extend to you the right hand of fellowship. [Applause.]

The Sacramento delegation came down to assist in any way it can in solving this great problem of finding some means for allowing the prosecution of hydraulic mining which will not injure the rivers or our homes, and in any means that will accomplish that object we are with you. We will work with you, doing what we can to accomplish it. We know that the people of the State of California, ourselves included, are as much interested in the prosperity of a great industry like mining, as we are in the numerous other industries which we now foster. We want to foster mining, and we came here to say that there is only one California, the greatest country on God's footstool, and we want to stand together and foster every industry that will tend to develop its great resources. [Applause.]

Gentlemen, I thank you for your attention, and I want to assure you with all modesty that we people in the valley, we rabid anti-hydraulicers, are fairly decent fellows when you come to know us.

Mr. McClatchy's speech was received with great applause and furnished the keynote to the harmonious proceedings subsequently carried on. Judge Aaron Bell, of Shasta, said:

I wish to say on the part of the mining men of the State that we, too, will extend the hand of fellowship to Mr. McClatchy and to those who represent the same interest as he. The mining men have no fight against any interest that is for the peace and welfare of this State. We wish to build up all industries, and we, as I stated a few moments ago, desire to extend the hand of fellowship to our brothers in the valleys. I was exceedingly pleased to hear Mr. McClatchy give to this convention and the people of the State his views on this subject, and to state that he was with us; that he was willing to extend the hand to us. Therefore in return, we mining men of California can afford to extend the hand to them.

G. H. Wheaton, M. P. Jones and E. T. Allen, a committee from the San Francisco

Board of Trade, and A. J. Ralston, Robert Watt and G. W. McNear, a committee from the Chamber of Commerce, were announced and admitted to the convention.

FROM MEMBERS OF CONGRESS.

The following telegram from Senator Felton was read:

T. B. Everett, Secretary Placer County Miners' Association: In response to your request I have to say, that realizing the great value and importance of the mining industry of California, not only to those immediately interested, but to the State and country generally, and fully appreciating the unfortunate condition in which it is placed, I would earnestly favor any measure or means that justice could demand or grant to restore its prosperity, or such portions thereof as may be possible, without injury to other industries or interests.

C. N. FELTON.

The following letter, received by Judge Bell of Shasta from Congressman Geary, was read by the permission of the Judge:

I send you by mail to-day full copies of the mining bill, and will be thankful for any suggestions on the subject that will make the measure more effective and will tend to the relief of the mining industry. I think it is entitled to the greatest consideration on the part of the Government, and will do all I can to encourage it. I thank you for your telegram, and hope to merit a continuance of your good wishes and those of the people. T. GEARY.

A recess was here taken so that the Chairman could make up the committees:

THE WORKING COMMITTEES.

On reconvening at 4:45 P. M., the Chairman stated that Metropolitan Temple had been engaged for next day's session. The following committees were announced by the chair.

Resolutions—C. W. Cross, Chas. G. Yale, San Francisco; J. B. Hobson, Placer; G. J. Carpenter, El Dorado; J. M. Walling, Nevada; F. M. Swasey, Shasta; Grove L. Johnson, Sacramento.

Permanent Organization—T. L. Ford, Sierra; L. S. Barnes, Shasta; D. K. Perkins, Butte; Edward Coleman, Nevada; S. K. Thornton, San Francisco; H. K. McCusick, Alameda; E. C. Voorheis, Amador.

Credentials—J. S. McBride, Nevada; Robert Howe, Sonoma; F. R. Wehe, Sierra; Thomas Fraser, El Dorado; M. M. Drew, Sacramento; A. B. Paul, Shasta; James O'Brien, Yuba; T. J. Nichols, Placer; James Tunstead, Marin; A. Walrath, San Francisco; H. V. Reardon, Butte; H. G. Blaisdell, Alameda; C. McMahan, Tuolumne; E. W. Jones, Colusa; H. R. Givens, Trinity.

Memorial—Chas. G. Yale, San Francisco; J. K. Luttrell, Sonoma; R. C. Downs, Amador; H. A. McCraney, Lake; G. W. Cox, Sierra; Myron Angell, San Luis Obispo; Frank McLaughlin, Butte; Patrick Reddy, Inyo; J. P. Haynes, Humboldt; W. W. Kellogg, Plumas; J. S. Cone, Tehama; James Nelson, Yuba; W. D. English, Alameda; I. H. Reed, Calaveras; A. B. Dibble, Nevada; J. M. Fulweiler, Placer; John H. Shine, Tuolumne; John McMurray, Trinity; J. J. Crawford, El Dorado; J. H. Lawrence, Merced; N. Coombs, Napa; Aaron Bell, Shasta; F. H. Hall, Siskiyou; R. T. Develin, Sacramento; R. M. Folger, Mono.

MR. LUTTRELL'S REMARKS.

J. K. LUTTRELL, of Sonoma: I move you sir, that the committee on memorial be requested to report such amendments to the mining laws of the United States as will enable us to resume mining as of other days, and as will enable us to protect all interests mutually. I think the committee of 25, representing all sections, if anything can be done at all, can make such amendments as will meet the wishes of all concerned. I therefore move you that they be requested to report such amendments to the mining laws. Motion seconded.

R. T. DEVLIN, of Sacramento: Does that mean hydraulic mining alone?

J. K. LUTTRELL, of Sonoma: It means all kinds of mining. There is no use of our doing anything at all unless all interests and all parties are protected equally before the law. We are here for the purpose of doing something in order that the industries of our country may prosper. In traveling through the country last year I passed through a number of villages where there were beautiful homes and schools and churches, and not even a person inhabiting them, and not even a dog to bark at you as you passed through the streets. If anything can be done for the benefit of the mining interests, for God's sake let us do it. [Applause.] Let these places become populated and give employment to the thousands of men who are going through our country to-day seeking an honest living. As it is to-day our mines are given up almost exclusively to Chinamen, and when they take an ounce of gold out, where does it land? It lands in China. It does not benefit you or me. It is like taking a sponge and dipping it in a tub full of water. They take it up and squeeze the water out in China.

I want to see every industry of our State prosper. I came here among the first that came to the golden shores. I have been engaged in mining and farming, and can therefore take an impartial view of the matter. I do not desire to injure the farmers

in the least, but if the engineers can suggest any plan by which we can resume hydraulic mining, let us make the attempt. A few years ago you could see the roads leading through Yuba and Sutter, and all those agricultural counties, and hundreds of teams on them, farmers hauling their produce up to the mountains, where they could find a ready market for all they could produce and return laden with bullion and ore. To-day there is not a team going into those counties. The mountains are deserted, and there are millions of dollars invested in them.

This is the most important meeting that has ever been held in this State. Let us make the attempt to bring back that old condition of prosperity, and if we fail we have at least discharged our duties as American citizens. If we are successful, these deserted villages will be inhabited by a happy and prosperous people, and those thousands of houses will be filled up with bright and happy children, and there will be helping hands working in the mines and adding millions and millions of dollars to the commerce of gold.

I say let us make the attempt. If we can accomplish anything, let us do it. My young friend of Sacramento, whom I honor for his good father, Mr. McClatchy, extends to us the hand of good fellowship. We accept the right hand of fellowship, and if anything can be done, let us do it. If this committee of 25 can suggest anything, let them do it, and then let us approve it; and if they can make a suggestion and agree upon it, and this convention adopts it, I say to you within sixty days after the bill is presented in Congress, Mr. Harrison will approve the bill [applause], and prosperity will prevail all over our State. Therefore, I hope my motion will prevail.

MR. DEVLIN SPEAKS.

MR. DEVLIN, of Sacramento: I have no desire to take any exception to the remarks made by my distinguished friend, Mr. Luttrell. It is only as to the scope of his motion. There is no people who would more gladly see the hamlets and the villages of the mining regions of California filled with a happy and prosperous population, than the people of Sacramento. They would be glad to do anything that would secure that result, if it could be accomplished with no injury to them; but as I understood his motion, it was that an instruction be given to the committee on memorial to ask Congress to change the law in regard to the present state of affairs. If he means by that to pass laws by which engineering skill may aid them in determining their work, we of Sacramento will stand with him hand in hand. It is only to the language in which he expressed his motion that I desire to speak. As I understand this convention, and as I understand from personal conversation with the miners who are here, they recognize as fixed facts the decisions of the courts; they recognize the law has been declared and been determined, and as law-abiding citizens they desire to act within that law, and ask Congress to make appropriations to carry out the report of the engineering commission, whereby in proper places dams or other structures may be erected by which mining may be resumed without injury to the rivers or the lowlands below. If that be the object of this convention, and that is the object of the resolution, I have no objection, but the gentleman stated that it went further, and I will ask him, in order that there may be no misunderstanding—our people have, up to this time, acted in unison with you—that the scope of the resolution is not to change the decisions of the courts, but simply to secure appropriations for the purpose of enabling improvements to be made, in order that mining may be resumed without injury of the character complained of in the past, and it was simply as I said, because of the language of the resolution, that I asked the question.

MR. LUTTRELL: Mr. Chairman, in answer to the gentleman's remark, the motion was not to interfere with the decisions of the courts. It was simply to take such steps and, if possible, to make laws, and by means of civil engineering to construct dams and so forth, as will enable us to resume hydraulic mining, providing it does not destroy the interest of the farmer below. [Applause.]

MR. DEVLIN: I agree with the gentleman exactly; it is just what we want.

THE MINING LAWS.

MR. WALLING: I want to say just a few words, not for the purpose of discussion, but because it seems to me that the suggestion made by Mr. Luttrell is eminently proper. [Applause.]

You will all recollect that at the last session of Congress, Senator Stewart introduced bills looking to the amendment of the mining laws of the United States. Those

proposed laws and amendments were not acted upon. They will be again presented at the coming session. There are many things included in the present law that are crude and ill-digested, and in order to show the mining man how necessary it is for this question to be considered, let me say to you that under the rulings and decisions of the courts to-day you can not patent a mining claim unless you prove that you have gone under the ground, and that it has an actual present value for mineral. Everybody interested in mining must know, and we are not surprised that our friend from Sacramento has not studied the mining law, but every gentleman must know that he has got to prove that the ten acres ahead of him is as rich as the ten acres he is working, or else he can not get a patent to it, and that is the death blow to mining.

It seems to me that this committee, composed of so many competent gentlemen, can inquire into this question. If we are going to foster the mining industry, we want the mining laws of the United States to be such that they will give the miner a chance to obtain a patent to his land without first having worked his claim out to find out if it would pay. [Laughter and applause.]

LET THE GOVERNMENT TAKE CHARGE.

J. K. LUTTRELL, of Sonoma: We don't propose any amendment that is calculated to do any injury to any farm in the State of California. We do not want a mine if it is going to destroy the agricultural interests of our country, but if there is such a thing, and it is the desire of this convention that we should resume mining if we can do so without injury to the agricultural interests, for God's sake let us have the opportunity of testing it.

Let the Government take charge of it and take hold of the appropriation, and I hope this convention will not adjourn until this question is decided, because if we fail to recommend to Congress what we agree upon here, then our mission is worthless. We will have accomplished nothing. As soon as the miners here agree on legislation, all the time keeping in view the rights of all industries in our land, protecting the farmers as the miners are protected, and we can get such a proposition before Congress, we can pass the bill in 60 days, and I am confident the Government will build the dams, etc., at its expense, and if we can accomplish that purpose it will add millions of dollars to our country, and no one will be more benefited than the farmers in the valley; but if we are to resume mining at the expense of the agricultural interests, then I do not wish to resume mining. I do not want to resume mining at the expense of any industry in the land. I want all to have equal protection before the law. I don't want any gentleman to shirk the question, because I do not shirk it. I want you to say that the miner has equal rights that the farmer has, and we ask for no more than the farmer has.

If any of you desire to come before our committee and give your views, we will be thankful to receive them, and none will I be more glad to hear from than my young friend, Mr. Devlin of Sacramento, as I recognize him as one of the most promising young men in the State, and one whom I admire and have confidence in. I say to the farmers, "come forward and give me your views, and we will see if we can accomplish something."

The Second Day's Session.

At 10 A. M. on Thursday the convention was called to order in Metropolitan Hall, about 1500 people being present. The report of the Committee on Permanent Organization was first read. It recommended that the temporary officers of the convention be made permanent, and that 30 Vice-Presidents be selected, as follows:

Hon. J. M. Walling of Nevada, Hon. Wm. D. English of Alameda, August C. Busch of Sierra, A. J. Ralston of San Francisco, Robert Watt of San Francisco, Geo. W. McNear of San Francisco, Col. Frank McLaughlin of Butte, Hon. Edward Coleman of Nevada, Ex-Gov. H. G. Blaisdell of Alameda, Hon. Dan'l T. Cole of Sierra, Ex-Sen. James G. Fair of San Francisco, E. J. Baldwin of San Francisco, Campbell P. Berry of Sutter, Mayor W. D. Comstock of Sacramento, R. D. Stephens of Sacramento, Hon. J. K. Luttrell of Sonoma, Thos. Brown of San Francisco, Hon. Thos. J. Clunie of San Francisco, B. D. Murphy of Santa Clara, Hon. Chas. F. Reed of Placer, James Nelson of Yuba, Hon. E. C. Voorhies of Amador, Hon. Alf. Tregidgo of Nevada, Geo. H. Wheaton of San Francisco, M. P. Jones of San Francisco, E. T. Allen of San Francisco, L. G. Cole of Alameda, James L. Flood of San Francisco, Hon. Albert Gallatin of San Francisco, Hon. Thos. Fraser of El Dorado, Hon. Mark L. McDonald of San Francisco.

The report of this committee was adopted.

W. B. Thorpe of Placer stated that the supervisors of Placer county had made an appropriation of \$1000 for the benefit of the Miners' Convention now being held, to help along the results thereof. They also passed a resolution to attend this convention in a body. The chairman, a member of the Placer county delegation, stated that this appropriation "was not made to fight our neighbors in the valley, but as some of us are impecunious, they concluded to pay our expenses to this convention." [Applause.] On motion of Mr. Thorpe, the supervisors of Placer county were allowed seats on the floor as voting members of the convention.

Mr. Neff, in acknowledging the honor of being elected permanent chairman, said: "We have met here under favorable auspices. Since the meeting of this convention the hearts of the delegates have been gradually drawn together, and from present appearances, I think we will be able to adjourn and sing the refrain, 'Behold how good and pleasant for brethren to dwell together in unity.'"

THE RESOLUTIONS.

Mr. C. W. Cross, chairman of the committee on resolutions, then read the report of his committee, as follows:

WHEREAS, The experience of the world has demonstrated that gold and silver constitute the only safe, convenient and reliable basis of credit; and

WHEREAS, The output of gold is largely below the need of mankind; and

WHEREAS, There are in the gravel beds of California vast quantities of gold estimated at \$35,000,000, which can only be utilized by being mined by the hydraulic process; and

WHEREAS, Hydraulic mining, as heretofore prosecuted, has contributed to the injury of the navigable streams of the central portion of California, and to a small portion of agricultural lands of the valleys, and has in consequence been interdicted by the State and Federal Courts; and

WHEREAS, A board of eminent engineers, appointed by the Government of the United States, has, after an exhaustive examination, reported that by the erection of proper dams, barriers and catchment basins hydraulic mining may be resumed, the debris therefrom impounded and no material injury done to the navigable streams or to the agricultural lands of the State; and

WHEREAS, Under the comprehensive terms of restraining orders heretofore issued by the Courts, hydraulic miners are prohibited from discharging the tailings from their claims into the ravines, canyons and streams tributary to the main rivers, even though so impounded; and

WHEREAS, The said injunctions are not against hydraulic mining in name, but against the dumping of debris into the streams, ravines, etc., where the same will flow into the navigable streams and it would therefore include all classes of mines, should any action be considered necessary to prevent the detritus from said mines entering the streams of California; mining in California is hydraulic, being the same in principle, running water separating the gold from the matter in which it is imbedded, and

WHEREAS, The business interests of the whole State of California and the monetary interests of the United States demand that vigorous measures be adopted on the part of the Government of the United States and the State of California to enable the gold mines of California to be worked to their utmost capacity without injury to other industries; and

WHEREAS, The total cessation of hydraulic mining entails a heavy loss on those who have capital invested therein (such investments amounting to \$100,000,000), and a loss to the State and Nation of an immense quantity of gold which cannot be profitably mined by any other known method; and

WHEREAS, The navigability of the rivers of the State is of vital importance to everyone having interests in the State, whether miner, farmer or merchant.

Resolved, That in the opinion of this convention and under the report of said Board of Government Engineers, the most practical method of accomplishing said purpose of reviving hydraulic mining and protecting said navigable streams from further injury, is for the United States Government to construct, or cause to be constructed, restraining barriers in canyons of the Sierra Nevada mountains of sufficient strength and capacity to permanently and successfully impound the debris from said mines.

Resolved, That said dams, when so constructed, will prove beneficial to the navigable streams of the State, not only by restraining the debris from the mines, but will also restrain material coming from the natural wash of the Sierra Nevada mountains into those streams.

Resolved, That in view of the fact that the Government of the United States sold to the miner his claim and received the cash therefor for the express purpose, and with the full knowledge that it was to be mined by the hydraulic process; and in view of the fact that the credit and very existence of our Government has been heretofore saved by the output of the gold mines of California; and, in view of the further fact that in every financial crisis which may hereafter arise, relief must be looked for from the same source; and, in view of the further fact that the benefit of the gold product of said mines of California annually to the country at large has been and will continue to be of inestimable value, therefore, we deem it but just that the expenses of constructing such restraining dams should be met by the general Government.

Resolved, That we recommend the passage of such laws by the State and Nation as shall rehabilitate the industry of hydraulic mining upon the erection of such permanent restraining dams as may be certified by competent U. S. Government engineers appointed for that purpose by the Government of the United States as safe and sufficient in strength and construction to properly restrain the debris from such mines, and prevent injury to the navigable waters of the State.

Resolved, That this Convention approves and indorses the recommendation for the improvement of the Sacramento and San Joaquin rivers as contained in the report of the United States Board of Engineers on mining debris in California, dated Feb.

9, 1891. We also recommend the appropriation of the sums recommended by the Government engineers for the improvement of the said rivers and the Petaluma creek.

Resolved, That it is the sense of this Convention that the general public prosperity demands a speedy and amicable settlement of the hydraulic mining question; a settlement whereby the rights and interests of the miner and farmer shall each be protected and whereby millions of new money may be annually thrown into circulation among the people, and that all citizens having at heart the interests of the State, are requested to further, by all means in their power, such settlement and the reestablishment of the interests of hydraulic mining under such conditions as shall be fair to all interests, and for the better carrying into effect of such settlement, we recommend that the Executive Committee of this body be authorized to confer with the Executive Committee of the River Convention, in its opinion, the objects of this Convention can be subserved thereby.

Resolved, That for the purpose of obtaining titles to lands for mining purposes in the mining regions, that in all proceedings before the Land Department, the interests of gold mining require that such lands shall be presumed to be of more value for mining than for agricultural purposes until the contrary is shown, and we recommend suitable legislation to accomplish said purpose.

Resolved, That we deem it expedient that a committee of three be selected by said Executive Committee and sent as speedily as possible to Washington, to assist our Senators and Representatives in procuring the legislation recommended by this Convention, and we therefore direct our Executive Committee to immediately take the necessary steps to select such committee of three, and to raise funds sufficient to pay the expenses connected with their mission to Congress.

Resolved, That we recommend the formation of an association in each county in this State in the interests of mining, to cooperate with the Executive Committee to be appointed by this Convention.

Resolved, That we proceed at once to organize permanently a State Association for the purpose of promoting the mining industry in California. That the officers of such permanent organization consist of a President, one Vice-President from each county, a Secretary, Assistant Secretary, Treasurer, and an Executive Committee to be appointed by the President to consist of 11 members-at-large and one from each county represented, whose duty it shall be to promote the objects of this Convention.

Resolved, That a committee of five be appointed by the Chair, whose duty it shall be to formulate and promote the adoption of amendments to the mining statutes of the United States.

Mr. Burrows of Nevada moved the adoption of the report. Grove L. Johnson of Sacramento rose and said: "I desired the privilege, as a representative from Sacramento county, to have moved the adoption of the report of the committee on resolutions. I can now only second the motion, and I do it with my entire heart, and in full accord with the resolutions. [Great applause.] I second the motion for the adoption of the report and, if I may be pardoned for saying a few words in reference to the matter, Mr. Chairman, I will do so now." In response to cries of "Go on," and "platform," Mr. Johnson came upon the platform and made the most brilliant speech of the occasion.

SPEECH OF GROVE L. JOHNSON, OF SACRAMENTO.

When I accepted the appointment, Mr. Chairman, as one of the delegates from Sacramento to this convention, I did so with feelings of apprehension, because the result of the attempt to fasten the apparently irreconcilable element of this State into one compact, homogenous production, which should represent only the people of the State of California, seemed to me doubtful. Having met with this convention, having met with the representative miners of the State, having met with the men selected to represent them upon the Committee on Resolutions, upon which, through the courtesy of the chair, I was placed as the representative of a valley county, I desire to say that no body of men ever yet exceeded this convention of miners in their desire to make peace with their enemies and to cement friendship with them. [Great applause.]

I find every man in this convention animated by the same purpose that under God, I believe I have and feel, namely, to do all in our power to aid the miners of this State, and to once more pour forth from the mountains of the Golden State that we all love, the millions of dollars that shall aid the commerce, aid the people, and aid, if need be, in the thrice of battle, the Government of the United States. [Great applause.]

In pursuit of an industry which at one time was the sole pursuit in California, which at one time when you spoke of a Californian you meant a miner and nothing else, and in the pursuit of that industry through the creation of your scientific and improved processes of mining, injury was done to the people of the valley, injury was done to the navigable streams of California, and the people of California did that which you would have done: They raised in their might to protect themselves. The courts have decided upon that question, and to the will of the people you as good citizens bow. [Applause.]

The point still remained that the gold was there. The gold should be dug from the mountains. How can it be dug? I have respect for engineers. I have faith in engineers. I have faith in scientific men, and when the Government of the United States appointed a commission of men so skilled in their business as was the committee appointed to investigate the mining debris, I had faith in them, and when they reported, I read their report and had faith in their report. Having faith in their report, I am willing, for one, and I believe I speak the sentiments of all true lovers of the valley, we are willing to endorse the report and give the miners the opportunity to once again work their mines, to once again wrest from the unwilling soil the money that will make themselves and their families happy, that will once again fill the schoolhouses and the churches and will make the hum of industry again resound through all the mountains of the mining counties of California. [Great applause.]

I have heard it stated that it is impossible to impound the mining debris. I have heard it stated that scientific men have erred upon this question. For one, I have faith in the inventive genius of mankind. [Applause.] I remember, and I am not so old a man, the institution of the telegraph of this nation, and although but a hoy, I remember the speeches of men then in regard to that invention as they speak now in reference to these dams; but the telegraph wires are a success and Samuel B. Morse won undying fame by carrying to success his invention. I remember, and I was one of those who crossed the plains in early days before the railroad was built, that I, like other men, said: "It is utterly impossible to build a railroad across the deserts and over the Sierra Nevada mountains," and I thought the engineers were mistaken. I laughed them to scorn, but the engineers were right, and the headlight of the locomotive starts from the Atlantic, in this country, and speeds its way for 3500 miles across a common country until it shines upon the waters of the harbor of San Francisco. [Applause.]

I believe to-day that there are engineers able, competent and willing to solve this question and to properly construct these dams in such a manner as, in the language of the resolutions, to impound the mining debris and prevent injury to the navigable waters of the State. And that is all we ask; that is all any man ought to ask. That is what the people desire; and when you are with the people you are right; and we are all right upon this question, because it is for the benefit of one and all. [Applause.] I congratulate you upon the harmony that has marked your deliberations so far. I congratulate you upon the resolutions. I believe we are going to enter upon a new era of prosperity in this State. I believe that the general Government is responsible for this condition of affairs, and I believe [applause] if a united delegation goes to the national representative hall in Washington and the farmer hand in hand with the miner of California [applause] knocks upon the door of the Treasury of the Nation, it will be open to us to carry out these works that we have projected and that we have endorsed.

They tell us in the "good book" that when the Prophet Moses struck upon the rock the waters gushed forth and the thirsting Israelites were made happy and content. So we to-day knock with the iron and the pick of the miner and the plow and harrow of the farmer upon the rock of the national credit, and streams of prosperity will flow forth to benefit not only our State but our whole Nation. [Applause.] All that is necessary is to be united. [Applause.] All that is necessary is to be harmonious. Let the dead past bury the dead. [Applause.] Let all animosities be drawn and buried in the slinkens that you have deposited in the bed of the river. [Laughter and applause and cries of "hurrah, hurrah."] Let us clasp hands across not the bloody but the yellow chasm that separated us in the past, and as the two sections of this Nation are now standing shoulder to shoulder in defense of the national honor at Washington, and are laboring only to see who can do the most for America, let the farmer and the miner of California only be envious to exceed the other in doing good to our common State. Then the blessing of the Almighty will rest upon this favored land; and we will be prouder than ever of our State, and ready to transmit it to our children better than we found it. [Great applause.]

The CHAIRMAN: "Gentlemen, the question is on the adoption of the report of your committee on resolutions. Are you ready for the question?" [Cries of "question, question."] Motion is carried.

The CHAIRMAN: "They are united with a hurrah." [Great applause.]

COMMITTEE ON MEMORIAL.

"The next business in order is the report of your committee on memorial. You will now hear from that committee.

"It affords me very great pleasure to introduce to you Charles G. Yale, editor of the MINING AND SCIENTIFIC PRESS, a gentleman who has, perhaps, given more thought and as much labor to this important question as any man in the State of California, and from him you will get a lucid statement in this memorial." [Applause.] Mr. Yale spoke as follows:

Gentlemen, after having been so pleasantly introduced I think the best way for me to reciprocate is to refrain from making a speech. The fact of the matter is I have talked about eleven miles of talk in the last three weeks, and whatever ideas I may have had have been expended on the gentlemen who have no ideas upon this subject. It would be entirely unnecessary for me to talk to all of you who know more about it than I do, but as far as the talk has been in the past it has been, I hope, where it would do the most good.

The committee of which I have the honor to be the Chairman met last night, and this subject of memorial was carefully discussed. It met again this morning, and the work it has accomplished is best shown by what I have to read. It is very short.

On motion of W. W. Kellogg of Plumas, seconded by J. B. Hobson of Placer, consideration of the committee's report was made the first order of business after recess. Mr. Kellogg said that from the reading, as he understood it, there were some words in the interests of the miners of California that should be inserted in the memorial.

The Afternoon Session.

As soon as the convention was called to order the Chair stated that the Committee on Memorial had discovered that in one particular their report did not agree with the resolutions already adopted by the convention, and they asked leave to temporarily withdraw the report for amendment. This was granted.

While the committee were absent a number of resolutions were introduced and referred to the Committee on Resolutions. Among them was one by James H. Law-

rence of Merced, relating to mineral lands in the Yosemite Park, including portions of Mariposa and Fresno counties, and asking Congress to exclude said mineral lands from the park boundaries. One was introduced by C. McTarnahan of Butte, relating to dams and flumes; one by Mr. Tulloch, proxy of C. D. Lane of Calaveras; one by Hobson of Placer, requesting Boards of Supervisors of Counties to appropriate money to pay expenses of a delegation to Washington; also the appointment of a committee of three to formulate an address to be circulated among the people of the State, together with a copy of the Report of the U. S. Board of Engineers.

The following was offered by V. S. McClatchy:

Resolved, That Congress be requested by this convention, in passing any laws providing for methods of continuing hydraulic mining without injury to other interests, to embody in all such laws a proviso that no Chinese shall be employed on any work constructed to furtherance of the Government policy or on any mines which may be operated under protection of such work.

This was seconded by Walrath and passed under suspension of the rules.

E. B. Price of Butte introduced a resolution, suggested by the Butte delegation, thanking Thos. B. Everett of Placer for his efforts in originating the plan of the State Convention, and his labors in carrying on the work. This was adopted amid great applause, under a suspension of the rules.

On invitation, Hon. Patrick Reddy of Inyo addressed the convention briefly, saying he was pleased indeed to find the proper spirit prevailing in the convention, since in this spirit, we can accomplish everything.

MR. CLUNIE'S REMARKS

Mr. President and Gentlemen of the Convention: I came down here to see the lion and the lamb lie down together, and I believe from all of the reports of this convention that they are getting along very nicely.

Of course we are all interested in every industry of this State. We are all interested in the mining industry. There is no calling in this or any other State of so much importance as the digging of gold out of the earth, because it adds that much to the material wealth of the country. It is not made by swapping jack-knives among ourselves, but it is that much added to the circulating medium of the country.

I believe, as I always have believed, that it is the duty of Congress to take hold of these important matters. I believe that not only the valley men but the mining men are proceeding in a way that will show good results for the miners of this State, and when you show good results for them you show good results for the entire State of California. You and I know, my friends, that if it had not been for the money dug from the State of California, from your soil, that the chances are we would have no country to-day. [Applause.] It was the gold of California that preserved the credit of the nation in its darkest hours [applause], and if there ever was an industry that ought to be fostered and encouraged it is the great industry of mining; but no honest miner that has justice in his composition can find any fault with the valley man or with the agriculturist, when he says that that great industry must not be prosecuted as to interfere with the industry of their neighbors. [Applause.] We have all come to that conclusion. We have joined hands together, and I feel confident that at this or at a future session of Congress, means will be afforded you to pursue this great industry, and in such a manner that in place of injuring the valleys, they will be greatly benefited. [Applause.]

In the days, my friends, when the lamented Abraham Lincoln was President [applause] of the United States, he called upon the State of California to furnish money and supplies and we did it without a murmur, the miners, God bless them, standing by him; and when he called upon us we furnished to the nation several millions of dollars, and from that day to this California never has received one single dollar of it. [Applause.] And yet, my friends, all of the States of this Union, except the Pacific Coast States, have been repaid. I say to you, could not the General Government put up a portion of this indebtedness in solving this problem? California would readily agree to this. Would it be asking too much? The General Government owes this money to us. It admits it. It is there in the treasury and it justly belongs to the people of the State of California. I say for one, as a citizen of this great State, that when we go there, backed up as we are by these facts and figures, we are bound to succeed.

In looking over the list of appropriations for the last 40 years—50 years, I might say, I found that 97 per cent of the appropriations have been given to the Atlantic States, while we have had to be content with only three per cent, and yet when you go to the archives of the Government to find out how much this great State of yours has contributed annually, you find its citizens paying into the National Treasury sixteen millions of dollars every year [applause] taken from the pockets of the people of California, who have already added to the wealth of the country \$1,200,000,000 in gold and silver. I say in the name of justice, we are not asking too much of the Congress of the United States when we say to them: "You sold the mine to the miner, you sold the land to the farmer; and these great industries, in order to have our State flourish, must go on hand in hand, and it is your duty to take such steps as are necessary to point out that way." I know that your appeal will be heard. I know

that you will be successful, and every man who has taken part in this grand convention will feel that he has rendered the State service.

Gentlemen, I had no idea of making a speech to you. I was told that I had the distinguished honor of being elected one of your Vice-Presidents, and I want you to understand that I esteem it an honor, because when I represented in part the people of this State in the State Senate, I opposed a bill to build dams by everybody who wanted to mine. I knew that there would be no responsibility attached to it. I knew that when we got through with our mining, that so far as the individual owners of those mines were concerned, the dams would be abandoned. They would have no more use for dams. The ground would be worked out, and I said it would not do for us to begin that sort of business; but when I suggested, as I did two years ago in Congress—I believe I was the first man to make a speech on this subject there—that it was the duty of the General Government to take hold of it, and when I found the miners all over the State recognizing that proposition, and desiring to fight for it, I felt that it was my duty as a citizen of this State to do all that I could to protect and to preserve and to foster that interest, and I want to say to you now, that with the Government at our back, that any plan suggested by them will meet my approval, and you will find me walking hand in hand with all of the miners of the State to bring about legislation that will foster both of these interests.

I was proud, my friends, when I saw my friend of many years, young Val. McClatchy, get upon the stand here and make the speech that he did. It showed that he was a noble son of a worthy sire, representing as he does the great and populous city of Sacramento, the capital of our State. He came here to join hands with the miners, and so did all of the delegations from those valley counties, to work together for a common end. I know and feel in my heart that you will be successful. I know in my judgment, with equities on our side, with the general Government in our debt millions of dollars, and interest for a quarter of a century, that they can not refuse the just requests of this convention. Gentlemen, I thank you, and will now give way to my friend, Gov. Johnson. [Great applause.]

Ex-Lieut. Governor J. A. Johnson then addressed the convention briefly.

THE MEMORIAL AGAIN.

The Chair announced that the Committee on Memorial was ready to report.

Chas. G. Yale of San Francisco said: "The very limited time at the disposal of the two committees, gentlemen, led to a slight conflict. The report of the Committee on Resolutions having been adopted by this convention, it was found that one of the paragraphs in the memorial did not agree with that report. Therefore, with your permission, the Committee on Memorial has changed that. I will read you the original paragraph and then the substitute. I wish to state, gentlemen, that this meets the objections of Mr. Kellogg of Plumas and others." [The slight changes made, with the amendment offered by J. M. Fulweiler of Placer, are incorporated in the copy herewith given.—ED. PRESS.]

Mr. Hobson of Placer wanted to specify the number and location of dams, so as to cover other districts than those mentioned in the Government reports. Mr. McTarnahan of Tuolumne also wanted this point covered.

Mr. Devlin of Sacramento thought Mr. Hobson misconceived the scope of the memorial. The report of the Commission does not provide for the erection of any dam at any place at Government expense. The convention was called to ask Congress to erect dams wherever they can be erected with safety and wherever they will restrain debris. All we ask Congress, is to make an appropriation sufficient to carry out the report of that Commission. The memorial fully expresses the sentiments of this convention. There has been no desire on the part of any member of that Committee to limit the erection of dams at any particular place.

F. R. Dray of Sacramento thought the wording of the memorial covered the entire mining districts of the State. On request, the Secretary again read the memorial. Mr. Tulloch spoke at some length. Mr. McClatchy, after the memorial had been read, said that it was general in its terms. It embraces every county in the State. That nowhere is any river or tributary specified with regard to hydraulic mining, and that everywhere does it say that the Government shall take care of hydraulic tailings so that they shall not injure the lands below, without specifying in any way, the locality.

Mr. Fulweiler's amendment (incorporated in the memorial) was introduced. Mr. McClatchy thought it unwise to patch the document. He was satisfied that every line and word in the amendment, with the exception of the last half dozen words, was already embodied in the memorial. Mr. Fulweiler said he had presented the amendment in the interest of harmony. There are always in a body of this nature and character men of different minds; men who

cannot see as clearly as my friend McClatchy can; who cannot take a few words and make sense of them. What difference does it make to us if by adding a few words and with the aid of a dictionary before us we harmonize matters. It is for this purpose alone I present it for your consideration; and I do not think the Committee on Memorial desires to employ any more time on a thing of that character, which only reiterates a little more particularly the language which the memorial contains anyway.

J. M. Walling of Nevada said: "It seems to me that the misapprehensions relative to this memorial grew out of this fact: All our proceedings and resolutions seem to have as a basis the report of the Briggs Commission, and consequently some of the mine owners feel that that report is local in its character, and that some general word which may be construed fairly to include the whole State ought to be put in. I think that is the only matter of dispute between us. It can be arranged in a few words, and I think it is wise to do it, rather than have any friends of the movement going away feeling that they have not been properly recognized." [Applause.]

THE MEMORIAL TO CONGRESS.

To the Honorable the Senate and the House of Representatives, in Congress Assembled: Your memorialists, representing the people of the State of California, in convention assembled at San Francisco for the purpose of considering the question of hydraulic mining and the improvement of the waterways of the State, respectfully represent:

That for many years there has been a conflict between the farming and hydraulic mining interests of California by reason of the debris from said mines injuring the navigable rivers and lands bordering thereon. By decisions of the federal courts injunctions were issued against these mines and they were closed down, throwing many persons out of employment and causing great loss of capital invested in mines, ditches, etc., and a great industry paralyzed. The legislature of the State of California, realizing that a rehabilitation of this mining industry would benefit the people of the whole State and nation if it could be accomplished by joint resolution, brought the matter to the attention of Congress.

In accordance with this resolution, Congress passed an Act appointing a commission of engineers for the purpose of ascertaining if some plan could be devised to adjust the conflict between the mining and farming sections and the mining industry rehabilitated, and for examining the navigable rivers and their tributaries with a view to improvement and rectification of the rivers.

That, whereas, this Board of Engineers Officers constituted, under the provisions of this Act of Congress entitled "An Act for the investigation of the mining debris question in the State of California," approved Oct. 1, 1888, have made an examination and investigation of the mining debris question in the State of California for the purpose of ascertaining whether some plan could be devised whereby the present conflict between the mining and farming sections might be adjusted and the mining industry rehabilitated, and have made an examination of the injured navigable river channels, and their tributaries and lands adjacent thereto, with a view to the improvement and rectification of said rivers;

That it appears from said report that there are many hundreds of millions of dollars of gold in the auriferous gravel deposits of California which can be extracted by the hydraulic process, filling the arteries of commerce and stimulating to increased energy all the industries of this State and of the nation, and that wise statesmanship demands that this vast amount of gold should be added to the wealth of the country, if it can be done without material injury to the navigable rivers of the State and the adjacent lands;

That it appears by said report that dams and other restraining works may be erected in many of the canyons, which will not only restrain the material producing the damage complained of in the past, but will also restrain the debris now dislodged, but still remaining in the canyons.

We respectfully ask that your honorable body accept and adopt the report of the commission appointed by you for the purpose stated, and that Congress at once take steps to put into practical and effective operation the means suggested by the engineers in order that mining may be again resumed in the manner indicated without the injury complained of in the past.

Your memorialists further suggest that Congress, having appointed this commission to determine the question, should accept and act upon its conclusions, which are of a nature to be acceptable to both parties to the controversy, in that they provide that mining can be again carried on under the conditions named, and also that the debris will be restrained from the rivers and farming lands.

It is proper to represent also, that at four different sessions of the legislature of the State of California resolutions have been adopted calling the attention of Congress to this hydraulic mining question in California. At the last session the Governor, in his inaugural address, brought the matter again to the attention of the representatives of the people, and the legislature on March, 18th, 1891, again passed resolutions which were forwarded to Congress, setting forth the facts and asking for relief.

We recognize the fact that until Congress takes proper action for the erection of suitable works for the restraining of mining debris, hydraulic mining is absolutely restrained by the

courts, and as law-abiding citizens, we recognize that the laws must be obeyed and the decrees of the courts respected; and inasmuch as the complete cessation of hydraulic mining until congressional action is had will be a great hardship to the mining regions and may result in their depopulation, we earnestly request you to take immediate action, in order that there may be an end of conflict and that no complaint may exist of enjoined mines refusing to obey the orders of courts.

We earnestly request you to make sufficient appropriations for the erection of dams or other restraining works in accordance with the report of said commission under such restrictions as to locality, size and extent of dams as may by law be provided for that purpose, in order that the debris resulting from hydraulic mining may be restrained as contemplated in said reports; and that said restraining dams shall be built in such rivers and streams and at such places therein as the needs of the mining industries and for the protection and preservation of farming and other interests of the State may require, as may be recommended by the Government engineers, and that all such dams shall be built and maintained at Government appropriation and expense.

That we recommend the appropriations recommended by the Government engineers for the improvement of the Sacramento, Feather and San Joaquin rivers and Petaluma creek. The commercial interests of the State of California and of the whole nation imperatively demand that these appropriations should be made.

Your memorialists above respectfully represent that the miners of the United States are dissatisfied with many of the rulings of the departments, which put unnecessary burdens upon them and prevent them from readily obtaining lands to the detriment of the mining interest. We respectfully ask that prompt Congressional action be taken upon the resolutions on the subject of the mining laws and department rulings, which were adopted at the California State Mining Convention, held in San Francisco, January 20, 1892.

Mr. Kellogg of Plumas wanted the amendment adopted, as it specified the Government must build the dams. Wm. Young, of San Francisco, also urged this point. Mr. Fulweiler's amendment was then read. The individual members of the Committee rose in their places and endorsed the amendment, including the Chairman, Mr. Yale, who stated that he very heartily endorsed it.

On motion then, the report of the Committee on Memorial, as amended, was unanimously adopted, amid tremendous applause.

THE STATE ORGANIZATION.

Dr. Schnabel, of Placer, suggested the immediate organization of a State Miners' Convention, but it was found that the resolutions already provided for that.

Grove L. Johnson, of Sacramento, in a neat speech, nominated Jacob H. Neff of Placer, for President of the Miners' State Association. He was seconded by E. M. Hull of Alameda, and Kellogg of Plumas.

Recess was taken for three minutes to allow the delegates from each county to select a Vice President from each county, except San Francisco, which is to have five Vice Presidents in accordance with the resolution adopted by the convention. The names are given elsewhere.

W. C. Ralston was nominated for Secretary and was unanimously elected. He said: "Gentlemen, I thank you. I have been working very hard for the last three or four days. I thank you for your kindness in electing me Secretary of the State Miners' Association. I have been a miner for a number of years, although still quite a youngster. My sympathies have always been with the miners and the industry, and I hope they will always so continue. I will try and fulfill the duties to the best of my ability."

THOS. B. EVERETT.

Mr. T. L. Ford of Sierra presented for the position of Assistant Secretary the name of a young man who had the honor of originating the movement whereby this convention is now held—Thos. B. Everett, of Placer county.

Mr. Neff said: "At the inception of this movement, Mr. Everett was in Auburn, and in conversation with a gentleman who published a paper there, suggested the idea, why not have the miners come together, organize an association and ask the good people of the valley to come and consult together. The gentleman of the press (Mr. Filcher) said it was an excellent idea. 'You write out a little bit of a note calling for a meeting and we will notify the mining men of the county to hold a caucus.' I was in Auburn at the time serving as a grand jurymen, and, walking in to the meeting, was made chairman of the caucus. The meeting was attended by the best elements of the county, regardless of calling, some farmers, some miners."

"We noticed we struck a popular chord. We called the county convention and they called this State convention. Mr. Everett acted as secretary. He has labored well and industriously, been at his post almost

(Concluded on page 88.)

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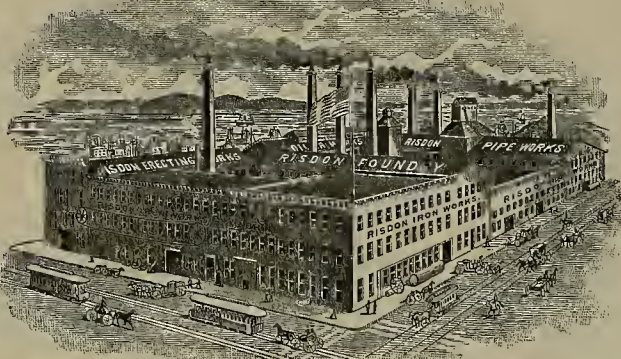
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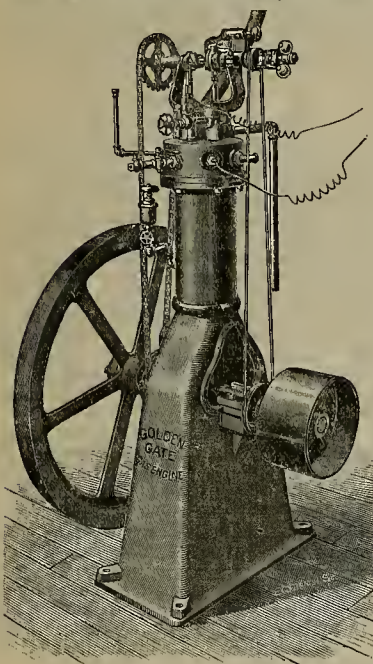
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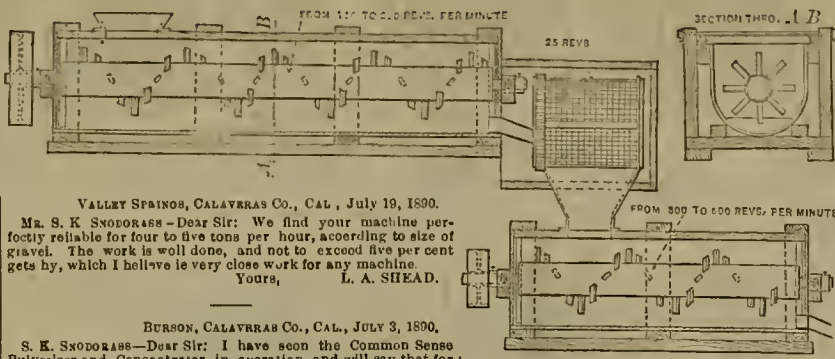
The machinery consists of two iron troughs or "concaves," each 26 inches in diameter, one of which is about 18 and the other 12 feet long.

In these troughs are strong revolving shafts with projecting teeth, made of steel, two inches wide by three-quarters of an inch thick, placed in spiral form around the shaft, about two inches apart, forming a conveyor.

The first shaft is arranged to revolve from 150 to 250 revolutions per minute, and the second one from 300 to 500.

There is a revolving screen between the two troughs that takes out the coarser rocks after being washed, and only the finer material runs into the second trough, and is there worked thoroughly.

There is a space of about four inches in the bottom of each trough, or "concave," that fills up with gravel and sand. When the gold is freed it settles into this, and as the teeth do not disturb the bottom, the gold remains there until a cleanup is made.



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Yours, L. A. SHEAR.

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S. K. SNODGRASS—Dear Sir: I have seen the Common Sense Pulverizer and Concentrator in operation, and will say that for all kinds of gravel and clay it is the best machine I have ever seen.

Yours respectfully, A. J. KNAPP, Miner for 25 years.

PLACERVILLE, CAL., July 15, 1890.

S. K. SNODGRASS—Dear Sir: I have worked with your machine in two counties, and have never seen the equal of it for washing gravel or saving fine gold. I have helped to clean up and found fine flour gold. I have put through it at the rate of 100 tons and over per day, and have also prospected the tailings thoroughly and found no gold in them. I have talked with other parties who have worked with them and say they are a good machine. Have been mining over 25 years.

Very respectfully, D. G. HUOHES.

VALLEY SPRINGS, OAL., June 30, 1890.

S. K. SNODGRASS—Dear Sir: I have seen the working of the Common Sense Pulverizer and Concentrator in clay and all kinds of cement, and have examined the tailings, and will state that I have never seen work done by any machine that compares with it. I have seen it when working from 100 to 150 tons per day, and been present when cleanings were made, and seen gold as fine as flour. I would recommend it for using in any kind of placer mining. I have been mining for 20 years.

Yours, J. D. COOK.

SAN FRANCISCO, March 25, 1891.

S. K. SNODGRASS, Esq.—Dear Sir: In regard to the work done by your machine, which we have had in operation for the past three months, I can say that it has handled successfully all material as taken out of our ground, the only cement which was not perfectly broken up being an exceedingly hard cemented material approaching rock in its hardness.

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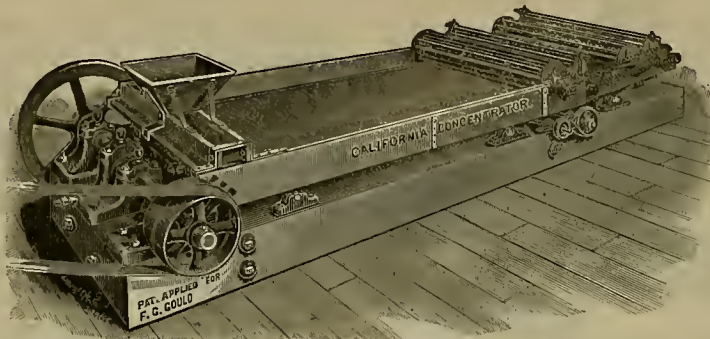
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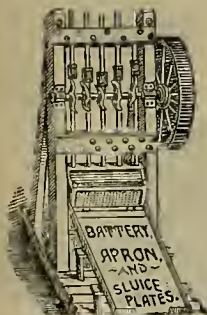
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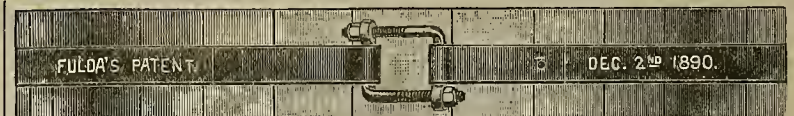
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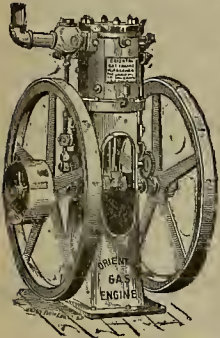
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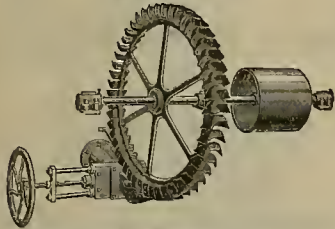
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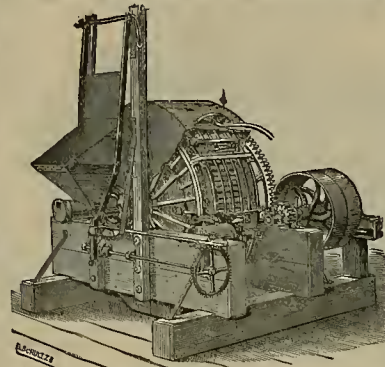
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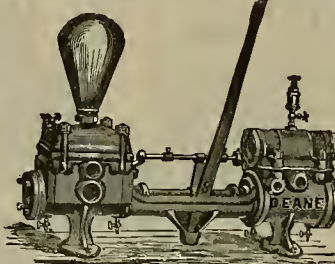
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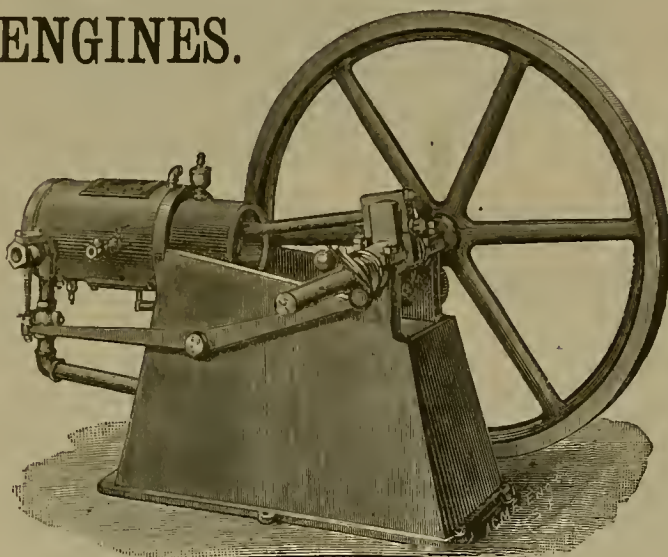
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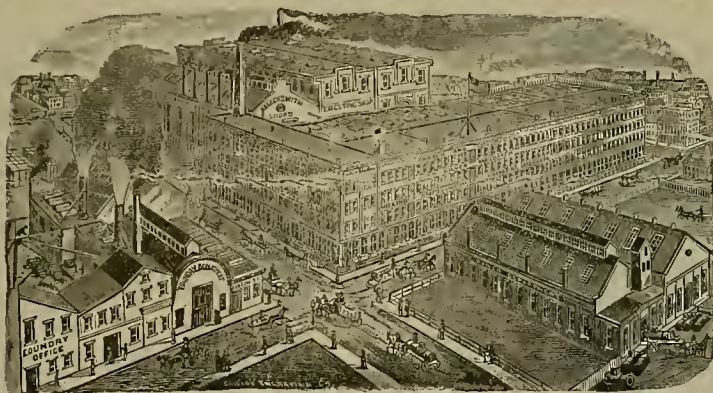
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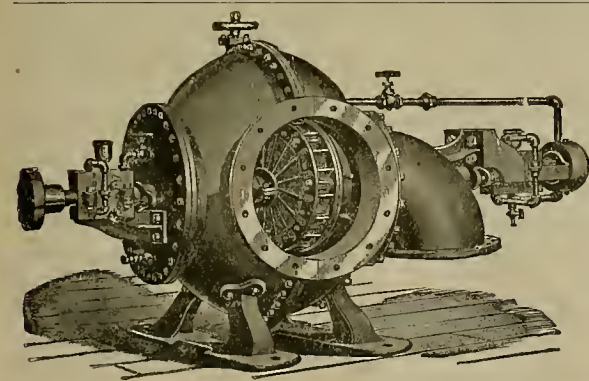
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State Miners' Convention.

(Continued from page 83.)

continually, and I think sent out about 25,000 copies of the address prepared for the occasion. He should be honored at least with the position of Assistant Secretary of the Miners' Association. I simply make this statement in justice to Mr. Everett."

Mr. Everett was unanimously elected Assistant Secretary. Henry Pichoir, of San Francisco, was chosen as Treasurer, on nomination of C. W. Cross.

A motion made by J. M. Fulweiler was carried, that each man accredited to the convention, and acted on favorably by the Committee on Credentials, should be a member of the State Association.

By a rising vote, the thanks of the convention was tendered to the San Francisco delegation, for the magnanimous manner in which they treated the convention.

An adjournment was then taken until 8 P. M., the meeting to be held at that hour in Pioneer hall.

The Evening Session.

As soon as the convention was called to order, Mr. Cross of the Committee on Resolutions said that the various resolutions referred to his committee had been acted on as far as possible in the limited time, and he reported that all the resolutions offered had been reported to the Executive Committee for proper action.

Mr. Huhn of Plumas addressed the convention briefly, suggesting that Sutter and Yuba and other counties that have enjoined the Plumas miners might dismiss the suits, and that will be a great starter on this great work of harmonizing the interests.

A delegate from Butte, a resident of Oroville, also spoke in favor of this action, and spoke of the dam across the main Feather river, above Oroville, built by Col. Frank McLaughlin, which has stood so well.

The thanks of the convention were returned to the permanent officers. Mr. Luttrell heartily concurred. He thought this the most important convention that ever assembled in the State. "It is one of the most intelligent bodies of men I ever had the pleasure of meeting with. You have accomplished a great work, and I look forward to great results. Owing to the unanimity of feeling which has been expressed here, I say let by-gones be by-gones. Let us pull shoulder to shoulder for the common cause and prosperity."

HON. C. P. BERRY'S SPEECH.

D. T. Cole of Sierra thought the convention would be very much pleased to hear from Hon. C. P. Berry of Sutter.

That gentleman, on request, went upon the platform, amid great applause, and said:

Mr. Chairman and Gentlemen of the Convention: I am not in the habit of speaking in public, and I feel, especially at this moment, somewhat paralyzed by the remarks of my warm and personal friend from Plumas in regard to Sutter county and our prisoners. As I have been so kindly invited to say a few words, I want to make a statement, and I will make it, because I am one of those people, and my people have been heavy sufferers in the valley, and I realize that at this moment my little county and the valley portion of Yuba county are located in the hotbed of the antining sentiment. I want to say to you here to-night, whatever may be your opinion of us, that we have felt in the fight that we made that we were fighting for self-preservation, and we had no personal enmity to the miner, and to-night, I, as an individual, rejoice at the turn that affairs have taken in this convention. I believe it forholds good. I believe that nothing but good results can follow from our action here. We have never contended for anything except that we should not be materially injured. You gentlemen here have pledged yourselves, since we have been forced into the courts to vindicate our rights, to accept the situation and the law as it stands; you have agreed with us here that you will recognize the law, and that you will obey its edicts until you can find a way out. Since you have done that, we join heart and hand with you, and we will say that our efforts that have been put forth before for our self-preservation shall now be put forth in your behalf, and look to the General Government to devise means by which the mining industry can be rehabilitated and by which the prosperity of the State may be advanced. (Applause.)

I wish to disabuse the miners here present of a feeling that perhaps prevails among them, and that is, that we are antagonistic to the mining interests. Such is not the case. We in the valley recognize the great importance of the output of gold. We are as anxious for your gold as you yourselves dare be, and we are willing to shovel mud and build levees, and drink muddy water, to the extent that we can, and yet exist, in order to get your gold. (Laughter and applause.)

We are not cranks. We don't wish to suppress any industry that tends to build up this great State. We look forward to the time when there will be means devised by which all the industries of this State can be prosecuted, and by which all its industries can be carried to the highest point. We look to the time when the hills will be full of industry, when we expect to see not only the mining operations in full blast, but the overflowed foothills protected by dams and other improvements, and we will have vineyards and orchards and water rights, and have industries and manufactures all over the foothills; and our great valleys will also be preserved and protected, and our rivers—those are perhaps

more important to California than every other industry—we must have our rivers, and while we have acted for self-preservation, it has also been for patriotism.

We wish this great State preserved. We wish that our rivers and our harbors should be preserved in their greatest efficiency, and we want our State and every industry in it developed, and to-night we are with you to join hands and to devise means by which our highest efficiency can be obtained.

Miners, we have accepted the pledge you have given, that is that you will obey the laws, and that we will not be compelled hereafter to send spies into the mountains to see whether you are invading the law or not; and therefore, accepting the pledge that you have given to us, now we are willing to second any effort that you will make so that the mining industry will be rehabilitated. (Applause.) It is because of this pledge that you find Sacramento county and Yuba county and Colusa county and the other counties of the valley helping you; otherwise, if we did not think you were sincere in this, we would still be compelled to throw ourselves upon our rights and contend for them.

Hoping that the results of this convention will result in your highest expectation and in ours, I thank you for your attention. (Applause.)

Mr. George Ohleyer was invited by the chairman to address the meeting, but did not respond.

THE MINERS NOT LAWLESS.

Mr. C. W. Cross, of San Francisco, desired to make a few remarks in reply to those of Rev. C. T. Berry. Mr. Cross said:

Mr. President, as one who has had occasion to be very familiar with the matters to which Mr. Berry mainly addressed himself, by reason of connection with litigation that has been carried on between the farmers and miners over the hydraulic mining question, I desire to say that the facts will bear out the statement that the miners of this State have shown themselves truer and better adherents to the laws of this State and of the commonwealth than did any other class of men under such trying circumstances ever show in the world. (Applause.) I will prove it to you. Mr. Berry, in his remarks, alluded to the matter of the Anti-Debris Association having sent spies into the mining region. Not only has the Anti-Debris Association sent spies into the mining region, but the United States Government has sent its spies into the mining region. For the period of five years and more, aye for the period of seven years, the spies spoken of by Mr. Berry have been constantly in the mountains roaming up and down the hydraulic mining regions continuously and in large numbers for the very purpose of ascertaining whether there had been any violation of the injunctions of the courts. The injunctions of the courts have destroyed property of the value of not less than one hundred millions of dollars. They ruined the means of livelihood of nearly one hundred thousand people; they utterly wrecked one of the most prosperous industries that ever existed in the history of the world. It was an industry which, owing to its peculiar location, could be carried on surreptitiously. The result of these spies roaming up and down the mining regions for seven years has resulted in but sixteen charges of disobeying the laws. Any other class of men would have done something to resist those decrees, and the only reason why the miners did not was because they were a law-abiding people and wise counsels prevailed. It was well understood that the day would come when to the law-abiding citizen would come a favorable law, and the results of the deliberations of this convention indicate that that time is close at hand. These spies sent to the mining regions were sent there for the very purpose of seeing that the gold product of that entire region, so far as it resulted from hydraulic mining, should be cut off, and that product was of the value of from ten to twelve millions of dollars a year. Those spies frequently were men of excellent demeanor. Sometimes, unfortunately, and I believe without the knowledge of their employers, they were not, and yet with all those men roaming through these mountains by night and by day, in the daylight upon the hills and at night in the canyons, there was never a hand raised against any of those men by any of the men connected with the mining industry. (Applause.)

Let me point you to a case in my own county, and I do it in no spirit of hostility. When the decrees of the courts were rendered with regard to shutting off the water from the valley counties of this State, armed men organized and went en masse and prevented the carrying out of the decrees of the court. If there is a parallel to be drawn between those engaged in different pursuits, there can be no question but what the miners have shown themselves men among men and the peers of any people in obedience to the law.

I said that only sixteen charges for the violation of these decrees had ever been made, and many of those when they came to the court could not be proven even by the evidence of these spies. I do not say this in any spirit of animosity. I want those of the farming people who have called us vandals, who have spoken of us as carrying on a barbarian business, to understand that there has never been a law against this kind of thing except the decrees of the court; that is, there have been no statutory provisions against these things. It has been only the decrees of the court, which this convention is not disposed to question. There is nothing in the conduct of those people to indicate that they are vandals or are not law-abiding.

THE SAN FRANCISCO DELEGATION.

There is another thing that is worthy of consideration by this convention, and I think it would be well worth while to mention the fact when you go home and let the newspapers state the fact that this convention has been the largest representative convention that ever assembled in the State of California; that this convention in its constancy has represented a larger amount of wealth in the State than has ever any convention that ever assembled in this State, and we have been making some figures. Take the San Francisco delegation, and there never went into any political or other convention in the State a delegation from San Francisco representing the wealth and influence that that delegation in this convention represents; and if you will figure up the money interests of the San Francisco delegation in this convention, you will find that it represents wealth enough to buy the county of Yuba and the

county of Sutter and the county of Colusa and three times as many counties of just the same wealth. (Applause.)

I have been requested by some of the members of the San Francisco delegation to say just a few words on their behalf about delegates from other counties. The San Francisco delegation, as soon as it was regularly appointed, had a meeting and appointed a committee on reception of the members of the convention. It has done all that it could find an opportunity to do. The convention has been short. You came just about as the convention was about to assemble. We had but little opportunity to either receive or entertain you. We have been sitting in convention with you during its business hours, and have been busy much of the time out of the convention hours. It has been in no spirit of unbecomely if you have not received every attention that you could have desired, and it is the regret of this delegation that you go away so soon, before we have an opportunity to entertain more of you at our homes. We do not find in this convention one man that we could not decently and gladly entertain in any home in San Francisco. On the other hand we send to you the thanks of the San Francisco delegation for the pleasant manner in which you have greeted us on every hand.

THE FEELING IN THE METROPOLIS.

I will give you a pointer on the strength of this movement in San Francisco. When it was proposed to appoint delegates to this convention the leading business men of San Francisco, and representing the strong financial interests, came forward and requested the privilege of being delegates to this convention. If we had been allowed three or four or five times as many delegates, the places would have been all claimed. The difficulty has not been to get a full delegation of members representing the very best interests of San Francisco, but it has been how to keep out the large number of bankers and others who wanted to come into this convention; and after the delegation had been appointed, and as soon as this convention met, good, able and influential men of San Francisco have been rushing about the streets to see if they could not get some proxies to get into this convention and help along this work. (Applause.)

The business interests of the metropolis are largely involved in regard to the action of this convention and Congress with regard to the matters here proposed, and the San Francisco business men, the more intelligent and financial class, desire the very thing that this convention desires. They want the gold to come here and they want it to go into the banks; they want it invested in real estate, and they want to make further improvements, and gold is necessary in order to do it. They understand that the markets of the mining counties in this State are the best markets that any city ever had for manufactured and agricultural products.

Gentlemen, I did not mean to speak so long when I rise, and yet I have not said all I wanted to say. It is a matter of utmost importance, that when the delegates return in their homes, that they make haste in form in each county a compact organization to help forward the purposes of this convention. Do not come down here and resolve and go home and do nothing. Make your organizations go to work like some of the counties have already done.

Assist the State Miners' Association and its executive committee, and give to it every element of strength that you at home can give. But a small number have come from the country, but at home there are a large number who can help this movement and will do so. Arouse the influence at home. Do you understand what this Anti-Debris Association has accomplished? I want to see on the miners' side some of the spirit and movement that has been shown on the other side. I want to see them make a vigorous and earnest struggle, because we shall need it before we get through with this work. I thank you. (Great applause.)

A WORD FROM SACRAMENTO.

O. HARVEY, of Sacramento: I want to say one word in response to the numerous compliments that have been paid to the members of the Sacramento county delegation. I feel a good deal as Mr. Berry expressed himself—paralyzed, or more than paralyzed, at the unanimity that has resulted in the acts of this convention. At one time I had made up my mind it was not worth while to come down with that delegation to this convention, for the feeling that had formerly existed among the miners and the anti-debris people was so decided that I thought we could not obtain results; but I want now to say, in my judgment there never has been a time since this conflict commenced between the miners and the farmers (and we were all miners once) but what, in parliamentary language, it was in order at any time since this conflict commenced to do the very same thing we have done here to-day.

It has taken a long time to bring about this result, but I want to say for Sacramento county, which has been so complimented here, that we have acted in good faith, and we joined this convention heartily and hope it will reach its highest expectations.

M. H. MEADE, of Sierra: I rise for the purpose of requesting the members of this convention from the country to extend to the delegation of San Francisco a rising vote of thanks for the manner in which they have entertained the country delegates, and for their noble liberality in defraying all the expenses of this convention; and I therefore move that we extend a rising vote of thanks to the San Francisco delegation. (Motion seconded and carried unanimously.)

THE NEVADA COUNTY ORGANIZATION.

A. TREGIDGO, of Nevada: There was a gentleman, I think from Siskiyou county, wished to know something about our organization. As I have the honor to be the President of the Nevada county organiza-

tion, I think it is my duty to tell him what I know about it.

Gentlemen of the Convention:—I am not a speech maker, but simply a plain, ordinary miner, and when any person wants something that is hard to be done they always ask me to do it. We of Nevada were the first to respond to the call of our sister county Placer, and since that county started the ball rolling and we fell in line, I am delighted to see that every county in the glorious State of California is in line. We have organized and passed resolutions. We have an organization whereby we will allow everybody in Nevada county to come into that organization by paying one dollar, and he receives a certificate. We had 5000 certificates printed, and my secretary tells me he thinks it is better to have a few more printed before I get home. Everybody is coming into line.

Gentlemen, I hope that every county in the State of California will follow our steps in organizing and taking everybody into line, because those who are not directly interested in mining are indirectly interested, and they are all to reap the benefit of it. Then these county organizations will be under the State organization, will be subservient to the State organization and do what the State organization calls us to do, and furnish them with money. When our delegates go to Congress and say, "We are the representatives of 200,000 or 250,000 people," we have a voice and we will be heard. That is the way I think about it. Gentlemen, I thank you. (Applause.)

On motion of J. K. Thornton of San Francisco the convention adjourned sine die.

A band was in attendance and escorted Chairman Neff and the members of the convention to the Palace Hotel.

Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees, held on the 5th day of January, 1892, an assessment (No. 68) of Thirty (30) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 69 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1892, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 8th day of March, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Trustees.

ALFRED K. DUNN, Secretary. Office, Room 69 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

SAN FRANCISCO MILLING AND MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, West Point, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of January, 1892, an assessment, No. 1, of Two (2) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 56 Nevada Block, 309 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 16th day of February, 1892, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 8th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

CHAS. H. OSBORN, Secretary. Office, Room 56 Nevada Block, 309 Montgomery Street, San Francisco, California.

GRAY EAGLE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of January, 1892, an assessment, No. 27, of Six (6) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of February, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 7th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

A. W. BARROWS, Secretary. Office, Room 11, No. 303 California Street, San Francisco, California.

DELINQUENT SALE NOTICE.

CALIFORNIA CREAMERY COMPANY.—LOCATION OF principal place of business, San Francisco, California, No. 111 Front Street. Location of works, Novato, Marin County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 1) levied on the second day of November, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No.	Cert.	Shares.	Amt.
Kaupf, Julius	3	80	\$24.00
Kaupf, Frank M.	4	80	24.00

Did in accordance with law, and an order of the Board of Directors, made on the 24 day of November, 1891, so many shares of each parcel of such stock as may be necessary will be sold at public auction, at the office of the Company, 111 Front Street, San Francisco, on MONDAY, the 11th day of January, 1892, at the hour of 2 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with cost of advertising and expenses of sale. CHAS. MERSEFELDER, Secretary.

Office, No. 111 Front Street, San Francisco, California.

At a meeting of the Directors of the California Creamery Company, held to-day, the day of sale of the above delinquent assessment was postponed to MONDAY, February 1st, 1892, at two o'clock P. M., at the office of the Company 111 Front Street, San Francisco, California.

CHAS. MERSEFELDER, Secretary. San Francisco, Jan. 11, 1892.

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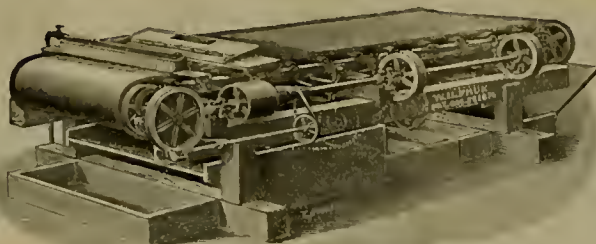
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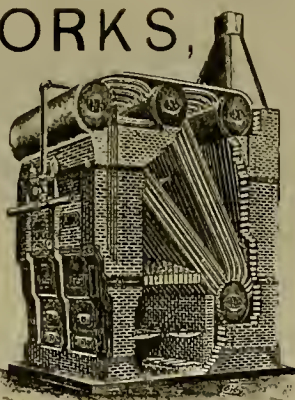
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file in the office of the undersigned. Bidders may propose
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the Company. Each bid must be accompanied by a
certified check for not less than 2% of the amount of the
proposal. The Directors reserve the right to reject any
or all proposals. EDWARD M. BOGGS, Engineer,
Banning, California.

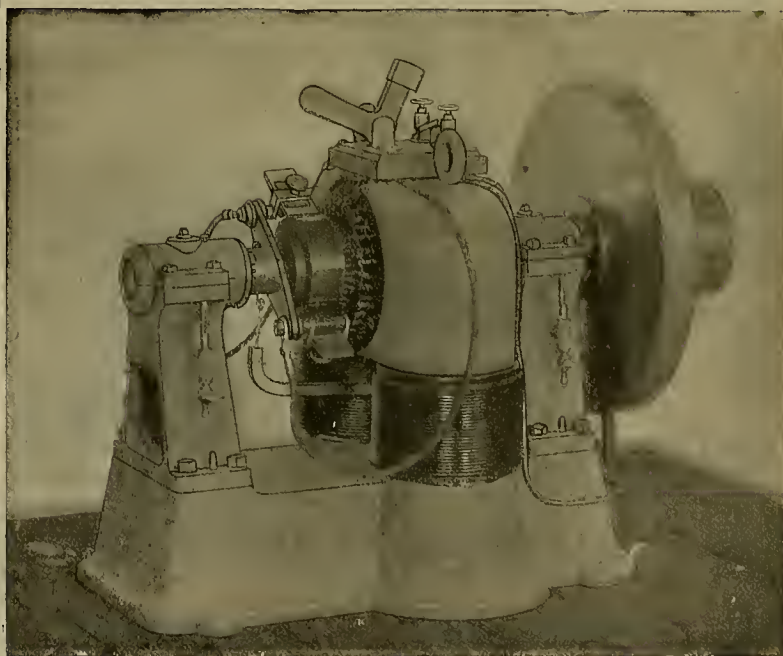
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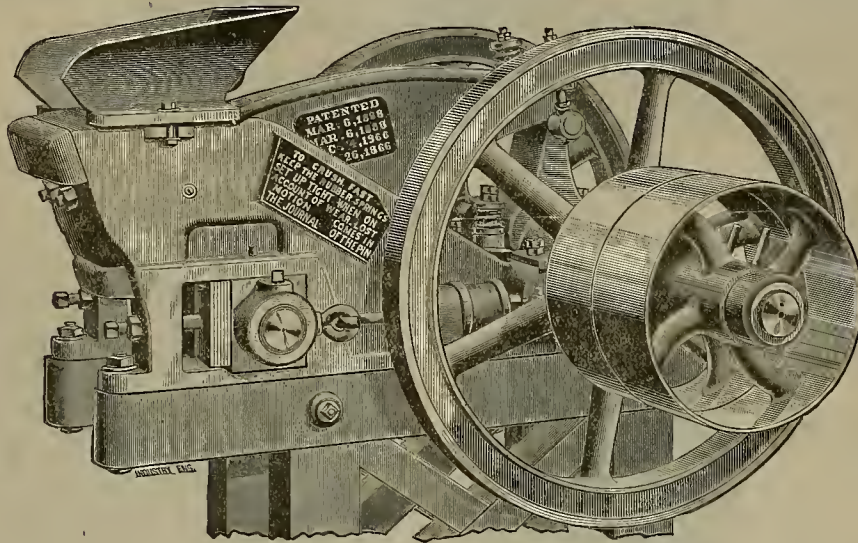
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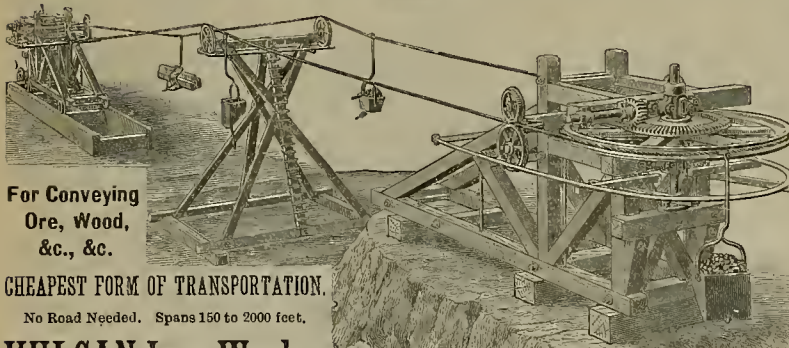
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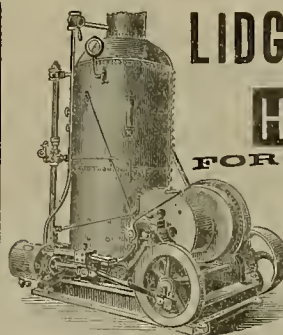
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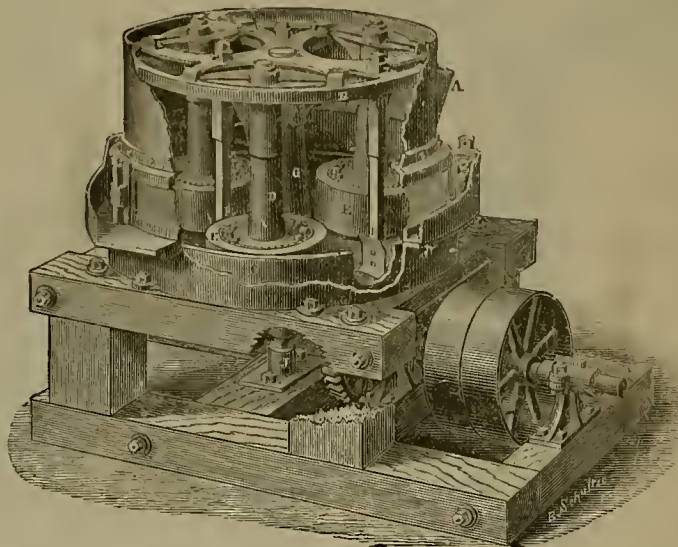
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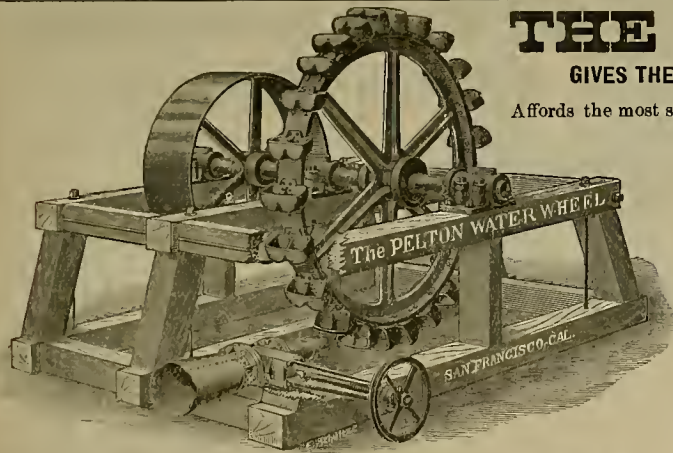
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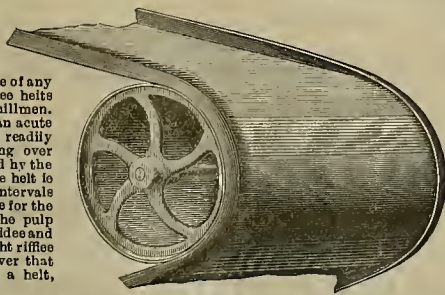
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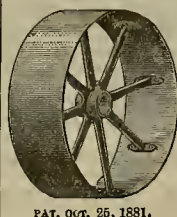
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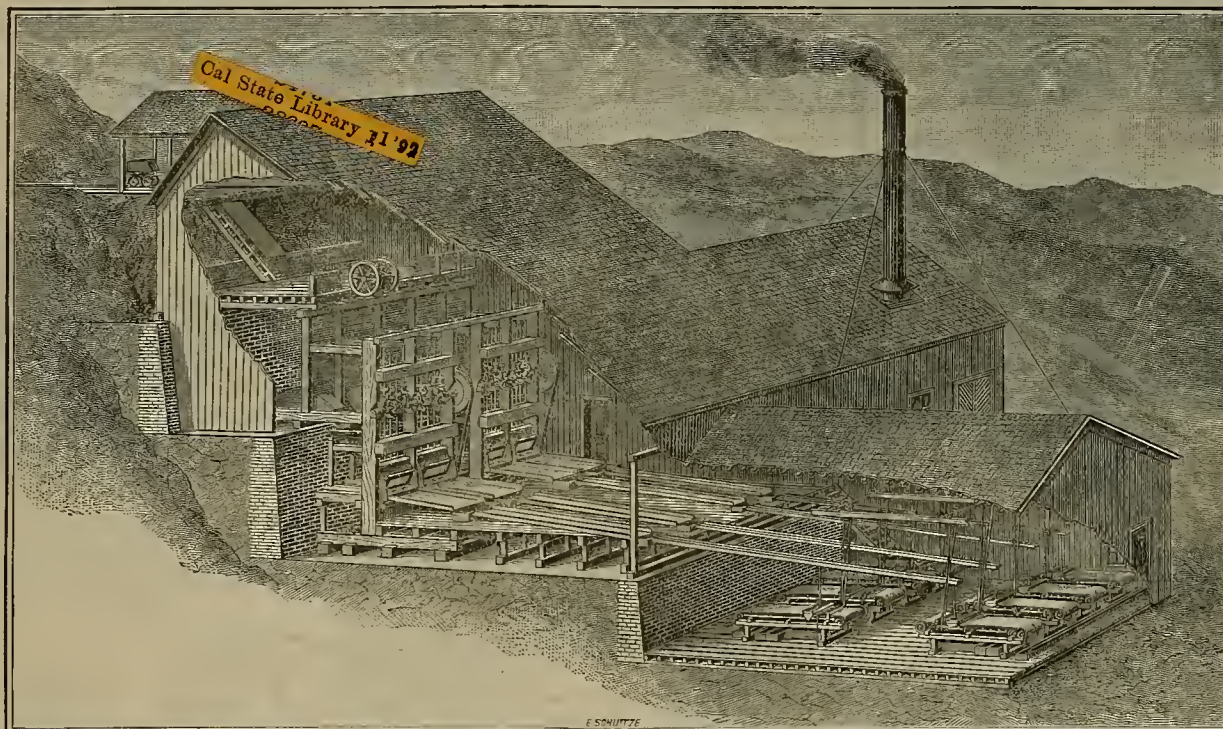
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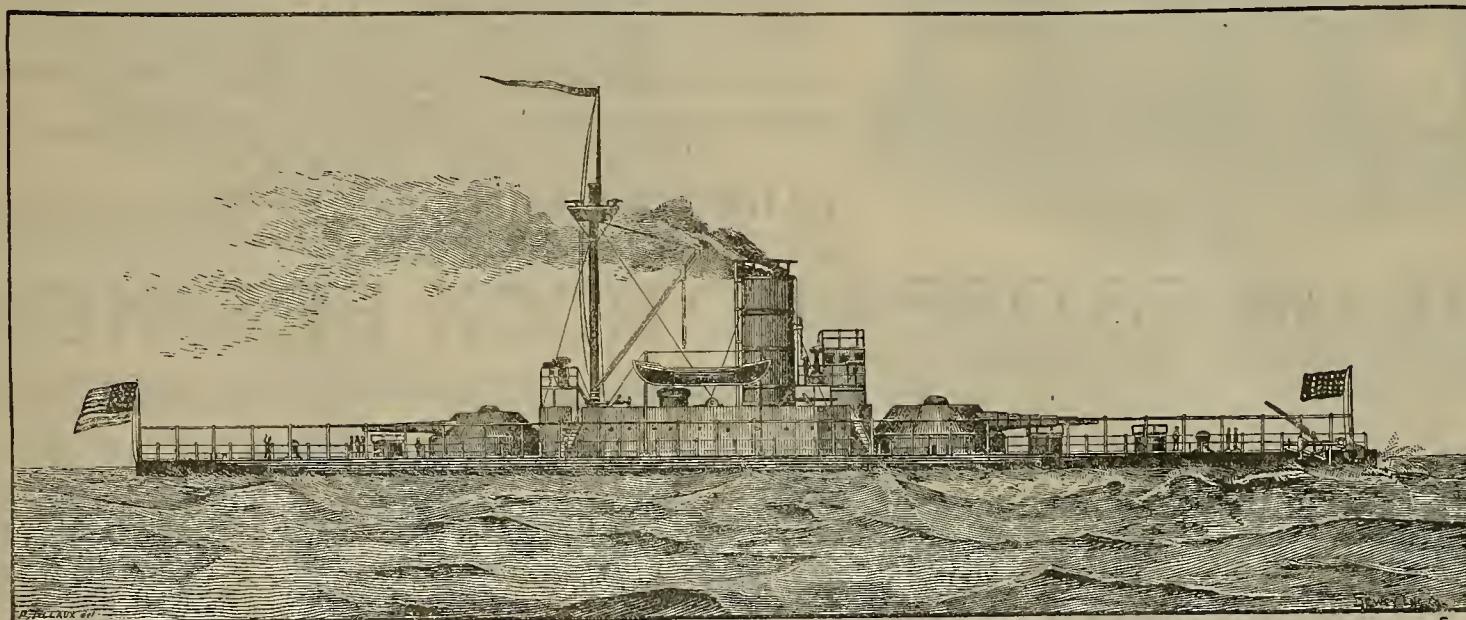
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The requirements of electrical appliances for use in mines has necessitated the production of a type varying considerably from those employed above ground, the condition in the former case being much more severe than in the latter.

The insulator and ear shown in the accompanying cut was designed for the use of the Thomson-Van Depoele Electric Mining Company, and is particularly suited to the purpose for which it was made.

The insulator body is of iron, thoroughly painted with Graphite paint, to withstand the action of the sulphuric acid in the mines, the insulator itself being made of pieces of porcelain, rubber or other suitable material, strong and large to withstand severe strains. Its construction is such that the insulation is entirely protected from blows of the trolley, should it leave the trolley wire, and at the same time little opportunity occurs for grounding, as the head of the hanger-bolt is embedded in the porcelain or rubber, and the only joint in the insulation filled by a soft rubber washer firmly forced into position when the trolley wire is screwed into place.

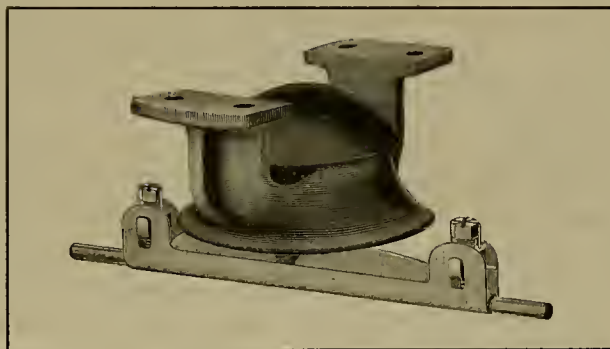
The only opportunity for surface leakage is on the under side of the insulator along the surface of the cone, and as this has been corrugated the liability of a leakage is reduced to a minimum.

The clamping trolley ear was designed by Mr. J. P. B. Fiske of the Thomson-Houston Electric Company, and is very easy to install as no soldering is necessary. Its security is greater than any soldered ear, as the wire cannot come down until the phosphor bronze clamp is worn through. Its life is almost indefinite, as the clamp is .032 inch thick and eight inches long.

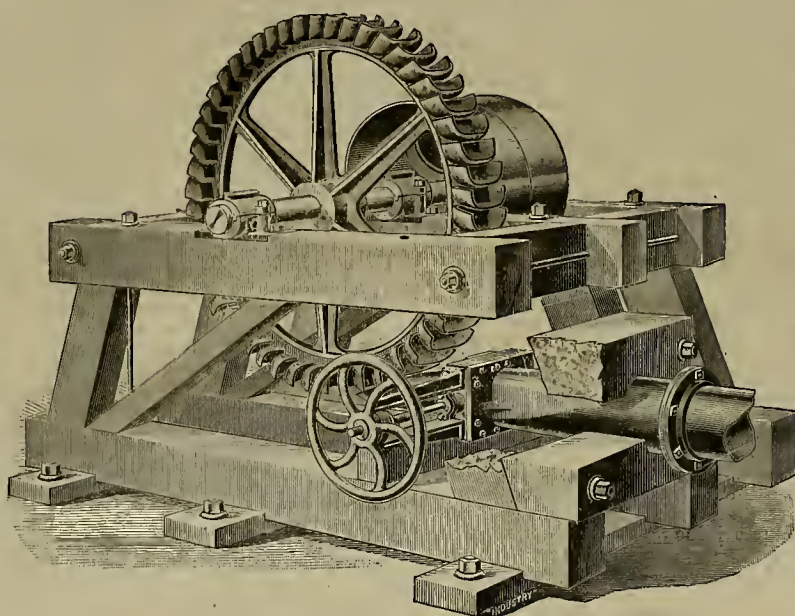
As the clamp can be loosened in a moment's time, the slack in the wire can be taken up at a little expense of time and trouble, a feature not possessed by the soldered ear.

The excessive sparking which occurs with the other types of clamping ear is obviated by making the bronze very thin, so that it can be easily reduced to a knife edge at the end where the trolley runs on. The clamping devices being located at the end where the trolley runs on the phosphor bronze, the latter is sure to be pulled tight against the wire at this point, thereby securing a good fit and preventing sparking.

The clamping devices are positively locked by means of a stout German silver lock wire. It is not possible for the screw to hack out even the fraction of a turn, without shearing off this wire, which is quite improbable, as the shearing force is practically nothing. There can be no corrosion or rusting of the clamp-



INSULATOR FOR USE IN MINES.



THE IMPROVED KNIGHT WATER WHEEL.—See page 101.

ing ear, as in its construction iron and steel have been entirely eliminated. Should the bronze clamping strip wear out, a new one can be substituted at a moment's notice.

A Digester for Cleansing Ramie.

The accompanying cut represents an improved apparatus, invented by Mr. Walter T. Forbes, for the purpose of treating the ramie fiber, and preparing it ready for the spinner. The process employed by Mr. Forbes is a chemical one; the apparatus shown is employed to aid in carrying out his system of work.

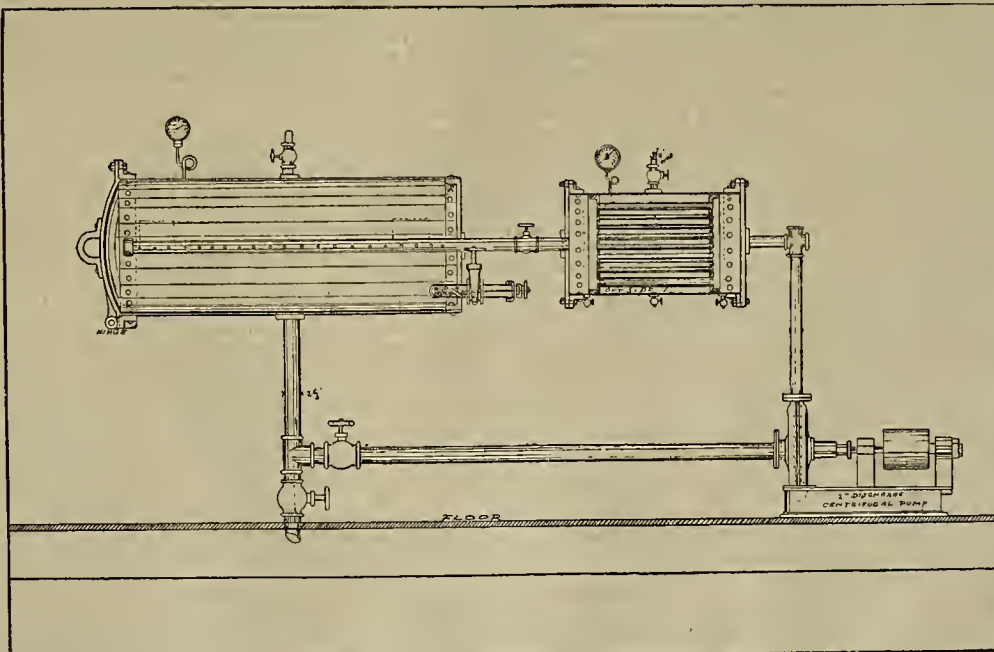
The crude ramie is placed in the digester and subjected to the action of a chemical solution under heat. The pump forces the solution through the heater into the digester, thus diffusing it through the mass of material. This action dissolves the epidermis (or outer bark) and at the same time dissolves the resinous gums in which the fibre is incased.

After this treatment of the fibre, it is allowed to dry, and is ready for the market in its unbleached condition.

Mr. Forbes also has a chemical method for instantaneously bleaching the ramie fibre. He is now having this apparatus manufactured at the Union Iron Works in this city, and will in a few weeks have it in active operation.

When completed, tests will be made, and those interested in this industry in California will be invited to witness the operation of the process.

This apparatus is the first of the kind, of any size, ever made in the United States, and is intended to demonstrate, on a proper scale, the utility of the method. The process is not unlike that of the making of chemical pulp in a paper mill. The fiber is not injured while the ramie is degummed and the outer scale removed at the same operation.



DIGESTER FOR CLEANING RAMIE, HEMP AND JUTE.

THE IOWA HILL MINERAL CONTEST. — Some years ago, John B. Hohson filed a mineral claim in the U. S. Land Office at Sacramento, covering a portion of the town site of Iowa Hill, Placer county. His claim was rejected by the Land Office on the testimony of citizens of the town that the land claimed was more valuable for agricultural than mining purposes. After a long contest, it was taken to the Secretary of the Interior, who has finally decided that the testimony as to the agricultural character of the land has not been established, but on the contrary, it was shown to have value as to its mineral, and that Hohson was entitled to file upon the land for the purposes of mining.

A RICH LEDGE has been discovered on the head of Sardine creek, near Gold Hill, Oregon.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—ED.

The Glacial Period.

A Discussion of Mr. Manson's Theory. SAN FRANCISCO, Jan. 27, 1892.

TO THE EDITOR:—Mr. Marsden Manson has recently (Sept., 1891) published a paper in the proceedings of the Technical Society of the Pacific Coast, presenting a new theory to account for the quaternary ice age. His results are, in a few words, that the earth must necessarily pass through a glacial period just before the waning influence of the earth heat is succeeded by the influence of solar heat previously shut off by the heavy fogs and clouds generated by the warm oceans. The climate of earlier geological periods was solely determined by the terrestrial heat, only light rays—not heat rays—being able to penetrate the deep mantle of clouds and vapors surrounding the globe. The gradual cooling of the earth finally exhausted the internal source of heat, the oceans keeping warmer longer than the continents on account of the higher specific heat of water. Finally in the language of the author, the isothermal shell of 32° F. shrank to the surface of the earth and the moisture of the atmosphere began to condense and accumulated on the continents as snow and ice. When the oceans could no longer give off enough vapors, on account of being too cold, the sunlight burst through and the present climatic conditions were inaugurated.

I shall not attempt to discuss the theory; my intention is simply to show how contrary the results of the theory are to certain well established geological facts.

The conclusion to which the author arrives is that the whole globe has at one time been glaciated. He states so explicitly, and proceeds to affirm that this is in unison with geological results. If the testimony from certain parts of the world is not conclusive it is simply because of imperfect exploration and knowledge.

Now nothing could be further from the facts. It is well known that during the ice age of the quaternary era certain parts of Europe and North America were covered by a thick ice cap, just as Greenland still is at the present time. It is further perfectly well known that Southern Europe and a very large part of North America were not glaciated. In the Rocky Mountain region and the Great Basin the old glaciers did not extend lower than an elevation of about 8000 feet. In California the glaciers at a quite recent time reached down to about 4000 feet in the Sierra Nevada, but their extent was small compared to the not glaciated part of the State. Besides, the age of these glaciers compared to that of the great northeastern ice sheet is a question open to debate. Probably they were much later. The Southern States, Mexico, Central and South America, all these were not glaciated. A possible exception is Patagonia and the higher Andes, which probably at one time were covered with ice.

Southern India and Ceylon were not glaciated. Only in the Himalayas, as in the Sierras, the glaciers at one time reached down to 3000 or 4000 feet above the sea.

The Karroo plateaux of South Africa, Central and North Africa have not been glaciated in recent geological times, nor has Australia. New Zealand had, indeed, at one time much more extensive ice fields than at present; but a late authority argues on excellent evidence that the glacial period there was of earlier age than that of Europe, and that the climate did not materially differ from that of the present time.

The geological evidence is in favor of a former cooler climate of many parts of the globe, a former larger extension of glaciers in certain regions of high elevations, the existence of an ice cap on certain parts of the Northern Hemisphere; but it is most decidedly and positively against a universal quaternary glaciation of the globe. Nor is it at all certain that the glacial phenomena, where observed on the Southern Hemisphere, are contemporaneous with those on the Northern.

It has been remarked that the "interglacial periods" afford an excellent criterion for glacial theories. They certainly are in this case, the offhand explanation of them given by the author being utterly inefficient.

I would further like to call the attention of the author to the rapidly accumulating proofs of earlier glacial periods. In Great Britain and in Central Europe, in South Africa, India and Australia, and only very recently in Norway, there have been found abundant evidences of a *Permian or carboniferous* glaciation.*

*See, for instance, "American Geologist," May, '89, W. LINDGREN, U. S. Geol. Sur.

Locating Mining Claims.

LINCOLN, N. M., Jan. 22, 1892.

TO THE EDITOR:—I noted some time since in your journal a clipping from, I think, a Montana local paper purporting to contain the advice of an old prospector to a tenderfoot on the location of a claim. Having been a miner, and also engaged in the practice of mining law for many years, I feel authorized to criticize the scree. In one particular the advice was sound. A hard leadpencil and a soft board are the best materials out of which to construct a location notice for posting. The rest of the advice, including the form of location given, is entirely unsound. So far from making a location notice purposely as indefinite as possible, every reasonable effort should be made to make it as definite as the case admits of. The law requires that the notice contain "such a description of the claim * * * located, by reference to some natural object or permanent monument, as will identify the claim."

The last utterance of the U. S. Supreme Court on this point, in *Hammer vs. Garfield M. and M. Co.*, decided April 8, 1889 (9, Sup. Ct. Rep's., 548), gives this provision a liberal construction in the interest of the ordinary prospector, but by no means authorizes a disregard of the positive requirement of law, and a notice in which no description with reference to a natural object or permanent monument (liberally construed) is attempted, may safely be treated as void.

Any practitioner with experience in mining litigation is aware that a very large percentage of that litigation arises from the absence of such references and the indefiniteness of notices in other respects. In the records of my own county are several thousand notices of location, certainly one-half of which furnish no certain guide to the locality of the claim. Many of them supply no definite information further than that the claim is within a so-called mining district of indefinite boundaries and the size of an Eastern county; and a very large percentage of the most worthless of these are the production of "old prospectors." The tenderfoot, in some cases at least, seeks competent advice on the subject.

This subject is of more importance to the prospector than to anybody else, whether he be an old hand or one just entering the business. The prospector is always poor; under no circumstances does he ever get out of his prospect, however valuable, its real value. After a lifetime of hard work and hard fare, he usually "goes over the range" as poor as ever. If a dispute arises over his claim, leading to litigation, it is usually with an individual or corporation having over him every advantage which learning and wealth combined can give; and in too many cases he has himself laid the foundation and given away his case by proceedings precisely similar to those recommended by the "Old Prospector" quoted by the Montana paper and recopied in the PRESS. X. X. X. X.

A National Miners' Organization.

LINCOLN, N. M., Jan. 18, 1892.

TO THE EDITOR: I am glad to note the miners' movement in California, looking to a permanent State organization.

In this age of huge combinations, unorganized interests count for little. Now, when your State organization is perfected, why not propose a national miners' organization? The proposition will come with a better grace from California than from any other State or Territory, perhaps. Such a proposition emanating from a powerful and compact organization of the miners of California will receive prompt attention throughout the mining regions. The demands of a compact national organization will receive prompt attention from political parties and Congress. Such an organization, while of necessity strictly nonpolitical, will as necessarily foster a spirit of political independence. If the mining interests can be made thus independent; if the miners of the country can by organization be invigorated up to the point of declining to vote steadily against their own interests (as they have mostly done in the past), the great parties of the country will enter into a prompt competition in concessions to the interests of the mining industry. In the presence of such an organization, silver will not heg in vain as in the past for equal recognition as a money metal; nor will the hydraulic miner ask in vain for national recognition, and if necessary for national removal of obstacles to the prosecution of his industry. In the presence of such an organization courts and departments would not be swift as now to transfer the mineral domain of the United States to great corporations, or to so-called "agricultural claimants," usually in such cases work-

ing in the interests of corporations and monopolists behind the scenes. Let us have a national organization by all means. J.

Rolling Mill Development.

London *Iron*, under the above head, and in the article hereto appended, gives an interesting resume of this great industry, and in closing takes occasion to pay a very handsome compliment to American iron workers, acknowledging that they turn out much more work, in a given time, both in the rolling mill and in furnace work, than do the English:

"Necessity is the mother of invention" is a good old proverb, and like other proverbs it has a foundation of truth. But while many inventions have been suggested by some pressing need, others, and we should say the majority, have resulted from other causes. In one case it has been possibly a question of nothing more than rivalry, and in another case only a man's desire to approach perfection as nearly as he could. Out of something good he has been moved to endeavor to evolve something better. Indeed, we might almost say that, if every invention could be traced back to its origin, there is scarcely a phase in man's complex character which has not at one time or another been the source from which some invention has sprung. But science is not particular to inquire into original motives, and, given that the idea is good, does not trouble about the parentage. While, however, science, arts and industries do not neglect any invention that promises well, the latter-day public knows very little about the great majority of new discoveries.

The truth is that the brain of man is now so active, constantly scheming and contriving, and one invention succeeds another with so much rapidity that people grow blasé and cease to wonder. They have grown so accustomed to marvels of mechanical skill and power, and to intricate pieces of mechanism, that it requires the discoveries of an Edison, breaking comparatively new soil, to attract much attention. The public has been well schooled in the great fundamental—what we may call the classic—discoveries and inventions of the past, such as the law of gravitation, the steam engine, the stocking loom, the electric telegraph, and others; but it knows very little of the multitude of new contrivances and adaptations in which the last quarter of a century has been so prolific. Some of these, if they stood alone, would awaken as much admiration and wonder as any of the great discoveries of previous times; but we are fast losing our sense of wonder now, under the continual succession of fresh novelties.

It is not necessary to go beyond the range of the iron and steel industries to find many illustrations of what we have said. Sir Henry Bessemer's invention, of course, enjoys a world-wide fame, but there are many others of great utility and beauty which are comparatively unknown outside the circle of the trade. A paper by Mr. Hunt of Chicago, recently published, gives a rapid survey of what has been accomplished in one department, and will enable even a lay mind to comprehend the great extent to which mechanical means are employed nowadays, and made to do work which appears to require almost intelligence for its accomplishment. It is a far cry, for instance, from the early two-high nonreversing rolling mill to the three-high mill of the present day, with its automatic tables and contrivances, by which upward of 1500 tons of rails can be rolled in 24 hours. But it is the old story again of patient labor and gradual development, first one improvement being introduced and then another, until almost everything is done mechanically.

When we read that the number of men required to operate a rail mill has already been reduced from 15 or 17 to five, it does not appear altogether beyond the range of possibility that Holley's dream may one day come true, "when we would start a rail mill on Monday morning, and then go home after locking the doors, only returning each morning to count the rails that had been made during the preceding 24 hours, no other manual labor being necessary."

But the record of the development of the rolling mill and the manufacture of steel rails is not one of unimpeded progress. Prejudice and even ignorance have often striven to prevent the adoption of improvements even after they had been practically proved successful. Nowadays it seems incredible that the method of reducing the steel ingot into what is technically called a "bloom," by the slow and laborious process of hammering, should have held its ground for any length of time against the now universally adopted plan of reduction by roll-

ing. Not only was it so, however, but no little prejudice both in England and in America had to be overcome before the latter process was fully recognized.

The economy effected by doing away with the casting of the iron into pigs, which had afterward to be broken up and melted in the Bessemer converter, by the simple device of carrying the iron in a molten condition direct from the blast furnace to the converter, even now continues to meet with a certain amount of opposition, although it may be said to be almost universally adopted. In certain quarters a preference is professed for the old method involving the remelting, and certain engineers continue to stipulate for it in their specifications. All which only proves that no amount of opposition and prejudice can really stop an improvement being adopted, if it prove to be effective; although one man, prejudiced or ignorant, and placed in a certain position of power, may do much to retard the march of progress.

The question naturally arises—how do the results attained in the rolling mills of England compare with those accomplished in America? So far as we know, nothing has been done in this country at all approaching the "records" described by Mr. Hunt. An average English mill will turn out, according to circumstances, 1500 tons to 2000 tons weekly, and even more may on occasion be accomplished. But at the South Chicago works the great total of 8152 tons in one week has been reached.* Even making allowances for this being exceptional, and the result of a special effort, and a desire to "lick creation," there is no doubt that our American cousins get much more out of their rolling mills than our steel makers do out of theirs; just in the same way as Americans beat us in their blast furnace practice. What is just the precise reason for this, whether it is the result of the more extensive adoption of mechanical appliances, or because their plant is generally better than English plant, our technical readers must judge for themselves; but we trust they will not approach a consideration of the matter with the idea that nothing is to be learned from Cousin Jonathan. The condition of the iron trade in this country is not such that our manufacturers can afford to leave any stone unturned.

*From an item in the adjoining column, it will be noticed that at a recent special trial at the Edgar Thomson Steel Works, 1907 tons of rails were turned out in 24 hours.

The Mountain and Valley Committees.

The Conference at Sacramento.

The River Improvement Convention at its recent meeting authorized its executive committee to confer with the executive committee of the Miners' Convention if occasion offered, and the Miners' Convention duly authorized its committee to take similar action.

The following account of the conference is taken from the Sacramento *Record Union* of Jan. 29: On Tuesday of this week the miners' committee requested a conference, and one was held in the parlors of the Capital Hotel yesterday afternoon.

The miners were represented by J. H. Neff of San Francisco, R. G. Hart of Redding, J. B. Hohson of Auburn, J. K. Luttrell of Glen Ellen, and William Irelan and S. K. Thornton of San Francisco. The River Convention's committee was represented by Dr. G. M. Dixon, R. T. Devlin and E. J. Gregory of Sacramento, A. C. Bingham and Dr. C. E. Stone of Marysville, S. D. Woods of Stockton and William P. Edwards of Petaluma.

The meeting organized by electing Dr. G. M. Dixon, chairman and J. B. Hobson, secretary.

The avowed object of the conference was to fully harmonize the interests of the miners and valley people. Earnest addresses were made to this end by Messrs. Neff, Hobson, Luttrell, Thornton, Bingham, Woods and Stone.

The discussion resulted in the adoption of the following resolution, which was introduced by Mr. Devlin:

Resolved, That in all legislation before Congress for the improvement of rivers and creeks, and for the erection of dams and other restraining works, whereby hydraulic mining may be resumed, the committees sent by the River Improvement Convention and by the Miners' Convention, be requested to consult and confer with each other, in order that there may be unity of action, and that both committees will use their best efforts to secure favorable legislation for each appropriation recommended for the rivers and creeks, and for the objects recommended by the Biggs Commission.

The following resolution, introduced by Mr. Irelan, was also unanimously adopted:

Resolved, That all hydraulic miners be and they are hereby requested to obey the decrees of the courts, and cease all hydraulic mining wherever the same is calculated to do injury to the navigable

streams or valley lands, or wherever the debris shall be carried into the navigable streams.

The miners' delegation agreed that their executive committee would immediately issue a public address to the hydraulic miners of the State, requesting that that class of mining be immediately discontinued, and not be resumed until the Government has so far progressed with the works, according to the plans of the War Department engineers, as to insure the navigable streams and tributaries against further damage from mining debris, the understanding being that if any person shall undertake to prosecute hydraulic mining within the period indicated he will have no help or support from the body of miners whom the convention represented.

The result of this conference makes it almost certain that the various sums of money recommended by the Government engineers for the improvement of the rivers and the restraining of mining debris in the mountains will be appropriated by the present Congress, as now the delegations from both conventions will go to Washington on a common footing, to work for a common interest. As there is power in unity they should succeed.

The conference adjourned amid the mutual exchange of warm and hearty personal congratulations between the mining and valley representatives.

Niagara Falls and the World's Fair.

From a recent issue of the Chicago Herald we make the following quotation:

"A. P. Brayton Jr. Vice-President and Manager of the Pelton Water Wheel Co. of San Francisco, has presented a scheme to the World's Fair Managers which for boldness of conception is a surprise even to the progressive people of Chicago. It is nothing less than to harness the power of Niagara to Pelton wheels and send it over the wires to run the great Machinery Hall of the Exposition.

Mr. Brayton has been for some days in consultation with several of our most prominent electricians as well as the World's Fair Managers with reference to the suggestion above named. There is a substantial agreement among electricians—that in view of the great advance recently made in long distance transmission of power—the project is at least within the bounds of possibility. At a potential of 100,000 volts, it is claimed that 3000 h. p. can be delivered from Niagara to Chicago—500 miles—at a cost for wire of about \$500,000, the loss in transit being not more than 25 per cent.

If successfully accomplished, it is conceded that this would be the drawing card of the Exposition and the wonder of the century.

Mr. Brayton has another scheme on hand of equal importance and magnitude. Ferranti, the great English Electrician and Engineer, has a concession from the Canadian authorities for utilizing the power of Niagara on the Canadian side, which admits of the power station being located directly opposite the Falls, making unnecessary the long drain tunnel now under construction on the American side, by which means a plant of a given capacity can be installed for less than one-half the outlay required in the case above mentioned.

This enterprise has dragged somewhat on account of the disturbed condition of English finances during the past year from which source, capital was to be furnished to carry it through. Mr. Brayton has succeeded in enlisting the interest of some of our most prominent capitalists in this undertaking and he leaves with them to-night for a trip to Niagara to make a survey of the proposed site as also to confer, by appointment, with some of the Canadian authorities with reference to the matter. This enterprise is regarded as the most promising power scheme the country affords, considering the large developments that can be made with a comparatively small outlay.

The power will be furnished by Pelton wheels located in an underground station, 140 feet below the surface, water being carried to them by lateral canals and from thence to the station by vertical steel tubes. After having passed over the wheels, it is then discharged into the river below the Falls. The wheels will be of capacity of 4000 to 5000 h. p. each and will be attached to the shafts of the generators direct without gearing. In addition to supplying local demands for power, it is proposed to run wires to Buffalo and transmit 20,000 h. p. to that city.

EARTH CURRENTS.—The earth currents consequent upon operating the electric railroads in the southern portion of London seriously affect the working of the magnetic instruments in the Greenwich Observatory, although that institution is miles away from the lines of those railroads.

The California Miners' Association.

Officers, Committees and Constitution and By-Laws of the State Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized. The officers of the Association are as follows:

HON. J. H. NEFF..... President.
W. C. RALSTON..... Secretary.
THOS. B. EVERETT..... Asst. Secretary.
H. PICHOR..... Treasurer.

VICE-PRESIDENTS.

NAME.	COUNTY.
R. F. Grigsby.....	Napa
Henry Martin.....	Trinity
Geo. W. Thomas.....	Marin
Frank R. Wehe.....	Sierra
Woolston Baughart.....	San Mateo
R. H. Campbell.....	Siskiyou
A. B. Brien.....	Yuba
Frank Fitzgerald.....	Yuba
A. B. Call.....	Amador
Dixon Brabban.....	Plumas
J. F. Ryan.....	Humboldt
Aaron Bell.....	Shasta
H. O. Harvey.....	Sacramento
D. K. Perkins.....	Butte
A. M. Hurdle.....	San Luis Obispo
A. Tregidgo.....	Nevada
Ex-Gov. H. G. Blaisdell.....	Alameda
T. B. Morse.....	Calaveras
Hon. A. M. Clark.....	Fresno
J. K. Luttrell.....	Sonoma
J. Crawford.....	El Dorado
R. M. Folger.....	Mono
Geo. F. Hoyte.....	Orange
R. McMurray.....	San Francisco
H. S. Chapman.....	San Francisco
I. C. Stump.....	San Francisco
B. T. Lacy.....	San Francisco
A. J. Ralston.....	San Francisco
John W. Maxwell.....	Tuolumne
Hon. R. Clark.....	Colusa
C. F. Reed.....	Placer
Chas. Bogan.....	Mariposa
James H. Lawrence.....	Merced

EXECUTIVE COMMITTEE.

Hon. J. H. Neff, Placer.	H. A. McCrany, Lake.
Louis Glass, San Francisco.	Jas. Tunstead, Marin.
Col. Dan M. Burns, S. F.	A. M. Bryant, Mono.
Col. F. McLaughlin, Butte.	W. K. Alderley, Napa.
S. K. Thornton, S. F.	Chas. Bogan, Mariposa.
Wm. Irelan Jr., S. F.	Jas. H. Lawrence, Merced.
Hon. O. W. Cross, Nevada.	Hon. J. M. Walling, Nevada.
Chas. O. Yale, San Francisco.	D. C. Pixley, Orange.
J. B. Hobson, Placer.	Myron Angel, S. L. Obispo.
Hon. Edw. Coleman, Nevada.	W. W. Kellogg, Plumas.
Hon. A. Walrath, S. F.	M. M. Drew, Sacramento.
Hon. J. K. Luttrell, Sonoma.	Thos. R. Church, S. F.
Ex-Gov. H. G. Blaisdell, Ala.	John Hays Hammond, S. F.
Hon. Jno. Daggett, Siskiyou.	Myron Angel, S. L. Obispo.
Hon. E. O. Voorheis, Amador.	N. J. Brittan, San Mateo.
E. W. Fogg, Butte.	George M. Pincey, Sierra.
Hon. F. Davis, Calaveras.	R. G. Hart, Shasta.
S. B. Boggs, Colusa.	A. W. Dana, Sonoma.
Hon. Thos. Fraser, El Dorado.	A. Howell, Stanislaus.
Mr. McDonald, Fresno.	C. P. Berry, Sutter.
W. H. Pratt, Humboldt.	C. McNamara, Tuolumne.
Hon. Patrick Eaddy, Inyo.	G. O. Kimball, Tehama.
J. O. Miller, Kern.	John McMurray, Trinity.
	O. G. Mayo, Yuba.

FINANCE COMMITTEE.

Louis Glass, San Francisco	Edward Coleman, Grass Valley.
Wm. Irelan Jr., S. F.	S. K. Thornton, S. F.
N. J. Brittan, San Mateo.	John Hays Hammond S. F.

COMMITTEE TO FORMULATE AND PROMOTE THE ADOPTION OF AMENDMENTS TO MINING STATUTES.

Hon. Niles Searles, of Nevada.	J. M. Fulweller, Placer.
Hon. O. W. Cross, S. F.	H. I. Thornton, S. F.
	Hon. J. K. Luttrell, Sonoma.

COMMITTEE OF CONFERENCE WITH RIVER AND HARBOR CONVENTION COMMITTEE.

R. G. Hart, Shasta.	Wm. Irelan Jr., S. F.
Frank McLaughlin, Butte.	J. B. Hobson, Placer.
Hon. J. K. Luttrell, Sonoma.	

DELEGATES TO WASHINGTON.

Hon. Niles Searles, of Nevada County.
Hon. J. K. Luttrell, of Sonoma County.
Robert McMurray, of Nevada County.
J. B. Hobson, of Placer County.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F. Stock Exchange Building.

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

SEC. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of this organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of eleven members selected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

SEC. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

SEC. 3. The President and Secretary of the Association shall be *ex officio* President and Secretary of the Executive Committee.

SEC. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of the Association.

SEC. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein prescribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

SEC. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall render annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

SEC. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by the Presi-

dent and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of the Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at the city and county of San Francisco.

SEC. 2. It shall be the duty of the Vice-Presidents of this Association to act once upon the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

SEC. 3. All persons friendly to the mining interests are eligible to become members of this Association. In the event that there is no County Organization, such person may unite with the State Association by forwarding his name to the Secretary, therefor, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

SEC. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected by such County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by the Executive Committee, Jan. 22, 1892.

BY-LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittees as they may determine. They shall fill all vacancies of the officers of the Association or members of any committee. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

SEC. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of the annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

SEC. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

SEC. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

SEC. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

SEC. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of each intended meeting.

SEC. VII.—The Secretary and Treasurer shall receive such compensation for their services as the Executive Committee may from time to time determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22d, 1892.

Mineral on a Government Reservation.

The Mining Ground in the Yosemite National Park.

The following is the resolution introduced in the State Mining Convention by James H. Lawrence, of Merced county, and referred by the Committee on Resolutions to the Executive Committee of the California Miners' Association:

By an act of Congress, approved October 1, 1890, a reservation of a tract of land embracing within its limits 42 townships was set apart for park purposes. It is known in official reports and on the maps as the Yosemite National Park, and its territory extends from and including township 2 north, range 19 east, southerly to the south west corner of township 4 south, Mount Diablo base and meridian, and from that point runs easterly to and including townships 3 and 4 in range 26. Altogether in round numbers its area amounts to 1512 square miles or 967,000 acres, less 36,111 acres known as the Yosemite grant, which is owned by the State of California. It is located within the boundaries of the counties of Fresno, Mariposa and Tuolumne. The southwest corner of this park is within five miles of the town of Mariposa, the county seat of that county.

Without taking into account the fact that it includes within its scope mountain ranches which have been occupied and cultivated for more than 40 years, and is a barrier against projected public highways and other improvements, it may be safely asserted that more than one-third of this vast area is known to be mineral in character. Of this over five townships, aggregating more than 100,000 acres, are located within Mariposa county, in the gold mining belt of the foothills, and embrace many mines which in years past yielded immense returns, and whose prospective value can only be approximately estimated.

That portion of the park located within the limits of Fresno county includes the Minarets and North Fork district, tributary to the San Joaquin, a rich mineral country only partially developed. Under cover of a pretended purpose of protecting the timber and watersheds of the streams tributary to Yosemite valley, and through the misstatements of irresponsible parties who represented that the entire territory was

unoccupied, uninhabitable and valueless a grievous wrong was inflicted upon the people of the counties named and a damaging blow struck at the mining industry of the State.

Wherefore do we who represent the mining interests of the State of California in convention assembled urge upon our Representatives and Senators in Congress the necessity of an amendment to the act in question, changing the boundaries of the Yosemite National Park, excluding from its territorial jurisdiction all lands known to be mineral in character, to the end that mining may be carried on in conformity with the laws and usages of mining districts, the statutes of the United States and the settled policy of our Federal Government.

Desist from Illegal Mining!

The Request of the State Association.

The Executive Committee of the California Miners' Association has adopted the following resolutions, which will be sent, in circular form, throughout the hydraulic mining regions of the State:

Resolved, That all hydraulic miners in California who may have been at work contrary to the decrees of the courts, if such there be, are hereby urgently requested by the California Miners' Association to desist at once from such operations and wait patiently until Congress is enabled to act upon the report of the Government Commission, which was appointed to inquire into the debris question in California.

Resolved, That it is the desire of the California Miners' Association, as far as hydraulic mining is concerned, to use every effort toward rehabilitating that industry on a legal basis; but that these efforts will be hadly hampered and the former contest be apt to be resumed if individual miners do not accept the policy of the Association.

Resolved, That it is the sense of the California Miners' Association that such persons as may start their monitors in the spring, at places where damage is likely to result to streams or adjacent lands, shall receive no aid or countenance in the future from this Association.

Resolved, That copies of the memorial and resolutions adopted by the State Miners' Convention be distributed throughout the mining regions of California, and that the miners be requested to read them carefully in order that they may fully understand the pledges of the Convention and the Association. Said miners are thereupon urgently requested to respect the opinions therein expressed, and to otherwise aid this Association in rehabilitating the hydraulic mining industry in this State.

Resolved, That we emphatically endorse the resolution adopted at the joint conference on Jan. 28th of representatives of the River Improvement Convention and the Miners' Convention, as follows:

Resolved, That all hydraulic miners be, and they are hereby requested to obey the decrees of the courts, and cease all hydraulic mining wherever the same is calculated to do injury to the navigable streams or valley lands, or wherever the debris shall be carried into the navigable streams.

The Mining Bureau Museum.

Recent additions to the collections of the State Mining Bureau are as follows:

Fossils, donated by Miss M. Hearn, Yreka, Cal.
Stannolite, Switzerland, Williamsburgh Scientific Society.
Manganese ore of good quality, from a large body at the Radovich mine, Stanislaus Co., L. Radovich.
Agate, cut and polished, Suisun, Solano Co., Geo. H. Suhren.
Selenite (French chalk), Hazel Creek, Shasta Co., Thos. N. Jones.
Rutile in granite, Humboldt Co., Cal. First time this mineral has been collected in California. F. McGowan.
Gold in crystallized quartz, Delhi mine, Nevada Co., Cal., R. McMurray.
Cinnabar in Pyrolusite, Stony Ford, Colusa Co., T. O. Schuch.
Fifteen specimens crystallized minerals from Europe. Exchange.
Nine specimens from New Jersey. Exchange.
Five specimens from Mexico. Exchange.
Thirteen specimens silver, tin and other ores from Peru and Bolivia. Exchange.
Selenite "phantom crystals," Ohio, and fragment of melonite, N. Y., Mr. Brayerman.
Fluorite. The first good specimen noted in California. Felix mine, Los Angeles Co. W. H. Adams, Jr.
Lead ore, Orange Co., gold quartz and silver ore, Alaska, Thos. Donland.
Fine ammonites and other fossils, R. Petersen, Sites, Colusa Co., Cal.
Fossils from Tuscan Springs and the Marysville Buttes.
Fine specimens of gold, cinnabar, copper, argonite, etc., etc., Sulphur Creek, Colusa Co. Presented by the Colusa Horticultural Society.
Twenty-five specimens of gold quartz from as many mines, representing Ophir district, Placer Co., Dr. M. Schuch.
Sandstone of excellent quality from quarry near Sites, Colusa Co.
Garnets from near California City, Marin Co.
Gypsum of excellent quality from a large deposit 12 miles east from Mojave, Kern Co., Cal., S. P. Maslin.

THE LONG POLAR NIGHT is to be made glorious day hereafter in Hammerfest, Norway, the most northern settlement of Europe, a village of some two or three thousand inhabitants, by the use of the electric light, which has recently been introduced into every house in the town. Three swiftly running streams, in the near vicinity, furnish the power through which the light is produced. The streams are simply torrents, the waters of which run so swiftly that they never freeze even in that arctic winter. Outdoor work there can be very readily performed by the reflected light of the sun, which sinks but a few degrees below the horizon. Artificial light is needed within doors only.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Butte.

JOURDAN HILL.—Oroville Register, Jan. 28: From parties down to-day from the Jourdan Hill mines we learn that seven men are employed on the Rainbow mine. They are engaged in cleaning and pumping out the incline which is about 150 feet deep. When this is finished, additional men will be employed and a tunnel will be run so as to take out a few tons of quartz, which will be crushed. If the rock pays satisfactorily, then it is stated a tunnel will be run from the East Branch side of the hill so as to strike the lode at a distance of 300 feet from the surface. There is a five stamp mill now on the mine and this will be increased if the ore proves as rich as is anticipated. There are some 15 or 16 men now at Jourdan Hill prospecting and looking for quartz.

OREGON CITY MINES.—Many years ago, when quartz mining was in its pristine glory in Butte, the Oregon City mines were among the richest in the State. Fabulous sums were taken from them and it was confidently asserted that if better and stronger pumping machinery had been placed upon them, so as to keep down the water, these mines would have been worked for many years. Now they are being opened by a large company, and it is thought they will pay excellently. On Saturday, the following parties, who are interested in these mines, came up from Woodland: H. C. Gable, J. F. Fink, A. Barney and Wm. Goeggel, and on Sunday, in company with E. McGrath, A. T. Graner, J. N. Friesleben and E. P. Farnham, all of whom are stockholders in the mines, visited Oregon City and inspected the work that has been done. It is reported that they were highly pleased with the work so far, and believe they have a bonanza in the property they own at that place.

El Dorado.

GRAVEL.—El Dorado Republican, Jan. 30: A fine bed of gravel from three to four feet deep has been developed in the Blair mine from which good prospects are obtained. A cannon-ball mill is now being set up on the ground to work the gravel, which is hard enough to require a milling process of some kind.

ELECTRIC PUMPS.—The Idlewild Co., operating the Taylor mine near Garden Valley, is putting in electrical pumps, lights and drills. This mine appears to be worked very successfully, and some recent reports announce very profitable results from the mill.

SHAW.—The mining outlook is good. The owners of the Shaw mine have just put in some new concentrators. The little mill has been running steadily for the past month or six weeks. The proceeds have been ample to pay all expenses, put in the new concentrators, etc.

CHURCH.—The success of the Church mine is an assured and permanent industry, and a standing evidence of the vast wealth of our quartz leads in this locality. Mr. Wm. Shaw, Sr., and Fred Hamill are running a drift in their mine, situated on Dry creek, immediately west of town. The rock in their drift is exceedingly hard, but they pan out good wages nevertheless.

Humboldt.

WILLOW CREEK GOLD.—Cor. Arcata Union, Jan. 23: But few people are aware of the change on Willow creek during 1891. Six months ago but one man was mining on the creek and few had any idea that gold was present in paying quantities. To-day about 40 claims are located on the creek. Many of these claims have good substantial cabins, and good prospects have been found on all. The gold is coarse and heavy and the water is abundant at every period of the year, and can be easily and cheaply carried wherever desired. Wonders have been done in a few months, when we consider the difficulties to be overcome. New trails have been made, cabins have been built, lumber for boxes carried in by hand or split from cedar, which is found here in abundance. Gold has already been sold from the following mines: The Bagley, Golden Dawn, Deer Lick, Helen, Soule, Curran and the Rebecca, some of the sales running up into the hundreds. Work on the Cora, the Eliza Jane and Larinia will begin at once. The Leland and the Golden Chance prospect finely and work will soon begin on them. As soon as spring opens the creek will be a scene of busy activity for nearly 15 miles. The climate is mild; timber of all kinds is abundant. The indications for gold and silver bearing quartz are unmistakable. The sale of the Willow creek mines on the Trinity is now an accomplished fact, and the mines on Willow creek itself will be the next objective point for mining capitalists. The mines are easily accessible, many of them being within one or two miles of the county road. Next summer will undoubtedly see a large number of men here.

Napa.

PALISADE SILVER MINE.—Calistogan, Jan. 27: The shaft of the Palisade silver mine is completed to its full depth—275 feet, with a 25-foot sump in addition, or 300 feet in all. Two weeks or more will be required to put the shaft in order for the running of the cage, and then drifting from the bottom of the shaft toward the ore vein will begin. The drift will have to be 100 feet in length through very hard rock, and considerable time will be necessary to complete it. The shaft has been deepened with the aid of three shifts of miners working eight hours each, but the drift will be made with only day and night shifts.

KNAPP CONS.—The lower tunnel of the Knapp Consolidated silver mine in Horn canyon was extended only 3½ feet with steady work, night and day, the whole of last week, which is the slowest progress we have known to be made in the district. This was true on account of the extreme hardness of the rock. The tunnel has been advanced to a distance of about 270 feet. The cost per foot last week was fully \$22, which is very costly for tunnel work. The blasting done there lately has been very heavy, and though 260 feet from the mouth of the tunnel, under ground and almost three miles from town, windows here have been slightly shaken, as we noticed particularly Saturday evening last.

QUICKSILVER.—The tunnel of the quicksilver claim owned by Jas. Teale and Jas. Simmons, in

the hills north of town, has been advanced a distance of 63 feet. Twenty feet more will have to be run before reaching the point where it is expected cinnabar will be found. The prospects are remarkably good for finding it. If the 20 feet develops cinnabar, as is expected, parties are ready to purchase the claim and engage in work there extensively. Some very rich cinnabar has been taken out of the claim. Labor in the tunnel of the Sunnyside silver claim, easterly from town, has been suspended the past ten days on account of sickness of miners engaged in the work. Work in the Black Bear mine, Pine Flat district, has been suspended, but only temporarily. The Chinese working force at the Napa Consolidated quicksilver mine has been greatly reduced since the destruction of their camp there a week ago. The Chinamen have scattered here and there, a majority of them going to San Francisco. The camp is to be rebuilt as soon as possible, and its location changed to the "new mine." The present output at the furnaces will not be reduced, as there is reserve ore sufficient to keep them going for a month. By that time the camp will be rebuilt probably, and the miners will have returned. Fifteen tons of machinery, received at Calistoga by rail, are being delivered at the Great Western quicksilver mine this week by Spiers' freight teams. The shipment embraced an engine, boiler, air-compressor, etc.

HUNT'S HILL MINES.—Nevada Transcript, Jan. 27: The Eastern and Maine mine, owned by A. G. Turner, is located at Hunt's Hill, on Greenhorn creek, six miles southeast of Nevada City. It lies in the great blue lead channel, and for years prior to the antidebris decision was a paying mine. It yielded during those years over \$600,000 and large dividends; to-day it lies idle because the motive power of capital is lacking. Acres of good paying drift gravel are there and have never been disturbed, save by a few prospecting tunnels, which have shown good prospects. A small part of the ground was drifted in the early mining days, but people were not content then with small profits, as nothing but extraordinary rich deposits were desired. The mine adjoining Mr. Turner's claim is owned by a gang of Chinamen, who are drifting it on an extensive scale. From good authority it is known that the mine has yielded about \$100,000 since 1883. Adjoining the Eastern and Maine mine on the south is the Jenny Lind, owned by M. L. Marsb of Nevada City. This mine has been idle for a number of years, but should hydraulic mining be resorted to it would probably be worked on an extensive scale.

Nevada.

THE ODIN.—Transcript, Jan. 30: One of the most important mining enterprises in this district is the Odin, a mile north of the city. The claim embraces the old Nebraska ground which was patented by the Woodville Company. In the fifties and sixties a small portion of the ground was drifted and yielded close to \$700,000. Last year Captain Harry Seymour, one of the oldest and best gravel miners in the State and formerly superintendent of this mine, organized a strong company of Nevada City and San Francisco men, and being elected president and general manager, commenced on September 7th the task of opening the claim in a systematic manner. Two inclines were started within 12 feet of each other—one in an easterly direction to tap the main channel at a distance of 465 feet, the other going southerly toward a branch channel or ravine 264 feet distant. The perpendicular depth of the main channel from the surface is 197 feet, of the branch 175 feet, as shown by former workings. The long incline is ten feet wide, and has three compartments, the other eight feet with two compartments. These inclines were put down 70 feet by hand and then the inflow of water stopped farther sinking. Subsequently a drain tunnel has been run 350 feet and passes under the present bottom of the inclines at a perpendicular depth from the surface of 70 feet. Under the capable supervision of Captain George A. Nibell, a building has been erected over the mounds of the inclines and supplied with a first-class plant of machinery, which includes a powerful hoist and a pump for each incline. The motive power is a five-foot Pelton wheel, run by water brought in by the Central House ditch, with 1200 feet of pipe and having 400 feet of fall. The incline leading to the branch channel will be put down first, nine men in eight hour shifts being employed. It will take about 40 days to reach bedrock and then sinking for the main deposit will begin. Captain Seymour calculates that the total expense of opening up both parts of the mine will be less than \$12,000. The Odin stockholders are not at all unreasonable in figuring upon a clear profit of at least \$75,000 from their investment, as there is, in the opinion of many familiar with the ground, a strong probability that they will reap a much larger sum.

THE FEDERAL LOAN.—At the Federal Loan work is being prosecuted vigorously on the 100, 300 and 400 levels, and much good ore is being taken out. Next spring, as soon as the road is open to heavy wagons, a powerful new pump will be put in and the sinking of the shaft will be resumed.

BONDED ANOTHER CLAIM.—The Knickerbocker gravel claim, just west of the Hirsman diggings continues to pay well and the owners have bonded the Grover & Murphy claim, which adjoins the Knickerbocker on the east.

WILL REOPEN THE DRAIN TUNNEL.—This week will be commenced the work of reopening the drain tunnel that was run some years ago to drain the Nevada City mine. It is about a mile in length and extends from the Wyoming mill to the western end of the Nevada City mine, and taps the ledge of the Nevada City at a depth of 500 feet. The tunnel has not been in use for some time, and is caved together in places.

CRUSHING FROM THE MERRIMAC.—Grass Valley Union, Feb. 2: A crushing of quartz from the Merrimac mine, just made at the Peabody mill, gave a return of \$21 a'load. This was taken from the vein through the drain tunnel, which is being reopened. This vein is showing a width of over 12 inches, and the quartz all looks as of a fair quality for milling. The prospects are considered very encouraging, and give strong hopes for the future of the mine when the old shaft is reopened down to the bottom of the former workings.

THE PROVIDENCE.—Nevada Transcript, Feb. 1: This morning the mill of the Providence mine was started up with 15 stamps. This will be good news to our people. The mill will now be run continuously, and as the ore taken out increases, more of the stamps will be utilized. As soon as possible,

the force of men will be increased, and, it is believed, in a few weeks as large a gang of men will be employed under ground as at any previous time. Carl Davis, one of the best mining men in the county, is the superintendent and has plenty of capital at his back to open up the Old Reliable in good shape. Mr. Davis is of the opinion that in a few months the mine will again be the leading one in this district.

IDAHO DIVIDEND.—Grass Valley Telegraph, Feb. 2: On Monday evening the directors of the Idaho Mining Co. declared a dividend of \$1 per share on the capital stock. This makes 260 dividends declared by the company. The mine is looking well throughout and is destined for a long life yet.

BLUE BELL.—The Blue Bell quartz mine, near Washington, in the upper part of this county, is now looking exceptionally well. Mr. Tregidgo received a letter to-day from his parties in charge at the mine, and the letter stated that they are drifting south on the 300 level and that the 100 and 200 levels are all being worked and are showing well. The 300 level is expected to show out some fine quartz before many days.

THE VULCAN.—The Vulcan mine has been leased by John Riley and company. The claim is leased for one year and work on the bottom ledge is now being done.

LIVELY PROSPECTING.—Grass Valley Telegraph, Jan. 27: Just now about as lively a prospecting camp as can be found is in and about Rough and Ready. There are innumerable quartz ledges around that place and it is a true saying that "you can hardly strike a pick anywhere there but that you find gold." Since the bonding of the Osceola and the recent rich rock which has been taken therefrom a spirit of energy has reached the populace, and now prospecting for quartz is going on actively. There is no reason why a good mine should not be found down there as well as anywhere else. The surface diggings around Rough and Ready were exceptionally rich in the early days, and much "quartz-gold" was found in those claims.

THE CHAMPION.—Grass Valley Telegraph, Jan. 28: W. S. May, the millwright, is just now figuring on improvements soon to be made at the Champion mine at Nevada City. New mortars will be put in, the machinery will receive a general overhauling and in all probability a new mill will be built. The mill now on the property is 15 stamps and is doing excellent work, but the recent developments at the mine are so flattering that a larger and better mill will be required. The ore from the Champion is very rich and there is plenty of it.

Plumas.

BRIGHTER OUTLOOK.—Plumas Co. Bulletin, Jan. 28: A brighter day is dawning for Plumas. In many parts of the county are evidences of renewed activity in business circles. The Genesee, Greenville and Crescent mines are attracting much attention, and the quartz interests west of Quincy are brightening the hopes of the people in this part of the country. About La Porte and Gibsonville, the outlook is much improved, while the country about Johnsonville will be the theatre of much activity next spring. The country in the vicinity of Buck's ranch and Granite Basin also is coming into notice. On the whole, the business situation is much improved.

MINE SOLD.—A. G. Swan, of Indian Valley, and Mr. Waldon of Granite Basin, were in Quincy Tuesday, completing the transfer of the mining property known as the Homestake and Siebert mine, situated in Granite Basin. Messrs. Waldron & Hubbard are the purchasers. During the past few months, they have had a bond of the property, with the privilege of doing such prospect and development work as they desired. The ore vein is small, being only a foot wide, but fully 200 feet of a chimney has been opened up, more than enough in sight to yield the purchase price of the mine. The ore is of high grade. The purchasers have thoroughly tested it by different processes of working, and we are assured by the former owner that it will yield between \$30 to \$40 per ton.

LA PORTE.—Plumas Co. Bulletin, Jan. 28: From J. D. McLaughlin, who is over from La Porte, we learn that there is considerable mining activity at Brown's Hill about four miles from Cascade and just inside the limits of Plumas county. Several Butte county parties have been prosecuting work on a quartz vein there, and lately they made a rich development. They now have a lode four feet wide, and it is said to be rich. It can be tapped about 600 feet deep.

PAYING.—In the same vicinity as the Brown's Hill quartz mine, is the McLaughlin drift mine, which is reported to be quite rich; now paying, under adverse circumstances in the method of operating it, \$75 per day to the man.

SAMPLE.—Development work on the Sample drift mine, at Yankee Hill, continues. This property is situated in Plumas, between St. Louis and La Porte. It is considered a good claim, and the owners are supposed to be obtaining good results from their labor.

THISTLE.—At Thistle shaft, about 80 men are employed, in and about the mine. The drift from the shaft is now in the mountain 1400 feet, and the gravel is reputed to be very rich, paying \$5-50 to the car load. It is claimed that the miners can see gold in the gravel. C. B. Wingate is superintendent of the mine, and F. A. Courley, foreman. There is some talk of starting a tunnel, next spring, in Wallace's Ravine. This would have to be run about one mile. By it, all of the Gibsonville ridge above Thistle Shaft, could be opened up. A rich Scotch company owns the Thistle mine. The presumption is that it will operate on a large scale in the near future.

A LONG TUNNEL.—The Claybank drift mine, just above La Porte, is owned by a Chicago company, which has been prosecuting development work during the past four years. The tunnel is in about one mile. A short time since a contract was let to drive another thousand feet of tunnel, which, it is thought, will tap the channel of the Gibsonville ridge lower down than Thistle Shaft.

The Riffe company is operating its mine, which is situated between St. Louis and Port Wine. They employ 12 men and are taking out money.

Several hydraulic mines in the vicinity of La Porte will operate as soon as the water season permits. They are so located that they can take care of their debris.

CRESCENT.—Plumas National, Jan. 30: Supt. Whitney of the Crescent mine, says drifts are being run at the bottom of the 400-foot shaft, north and

south, to strike the Pet and Horseshoe veins. The rock is very hard. From the 200-foot level a tunnel is being driven ahead to tap the Crescent lode. They are in some 70 feet at the bottom of the 400-foot shaft each way.

San Diego.

HELYETIA.—Julian Sentinel, Jan. 28: During the past month little has been said of the Helyetia, but this valuable property has been steadily improving and is now considered one of the best in camp. A visit to this mine one day last week, disclosed some facts not heretofore known to the outside world. How to get a sufficient water supply at first seemed a difficulty; but one that was easily overcome, and the mill is running day and night. A tank was placed just outside the mill and the water is caught and forced back into the tanks above and used again. In this manner a plentiful supply is always on hand. Not long ago the old workings of this mine were reached and a valuable body of ore of considerable extent encountered. Some 20 men are working day and night and the ore is coming up the shaft as fast as the mill can crush it. The ore averages from \$17 to \$40 per ton, most of it coming from the stopes. Among other improvements is a new 70 horse power boiler now on the road, which will furnish steam enough to run the mill and pumps, independent of the other boiler.

BANNER.—The Banner Mining and Milling Co. is working in some nice rock in the new tunnel that is being drifted into the hill from the mouth of the working shaft. This mine proves to be a veritable store house of rich ores, the extent and richness of which increase as development work is done.

CHAPARRAL.—The Chaparral is steadily pushing ahead, and a four-foot ledge of pay rock has been discovered.

Shasta.

GLADSTONE.—Shasta Courier, Jan. 30: The Gladstone Co. tied up pro tem, but is in full blast again, and its product was one 92 pound brick, and another of similar weight since.

TRAMWAY.—Redding Free Press: James Barron is engaged in putting in a tramway from the old Carson & Snyder mine to the mill.

THE CALUMET CO. intend bringing their capacity for working the new process (cyanide) up to 50 tons a day as soon as it can be done. The Calumet mill, which has been for some time altering for working the cyanide process on a large scale, will be completed in part, and will start running the coming week. Some very rich ore has been taken from the Poorman mine, belonging to the Calumet Company, and hauled to the mill, to be worked by the cyanide process.

NEW MACHINERY.—The proprietors of the Lost Confidence mine at Iron Mountain are preparing to put in about \$20,000 in additional machinery and in overhauling and repairing the plant. Twenty stamps will be added, thus making 40 stamps in all, and a new roaster will be put in. J. M. Gleaves has been installed as Superintendent of the Little Nellie mining property on Iron Mountain, and is making arrangements for active mining. Men will be put to work on the mine, and the ore will be sorted, a portion shipped for reduction and a portion worked in the mill.

IGO.—Alexander Ludwig of Igo informs us that the outlook for Igo is splendid, and it is the mines that are doing the business. Five mines are shipping ore to Selby with good results. John Wright recently shipped 12 sacks of 130 pounds each, and received in return \$203 in solid coin. These mines are all silver, with a percentage of gold in the ore. Wright shipped 25 sacks Thursday. W. D. Bull has about three tons sorted and ready for shipment. Eubanks has made a shipment and is taking out more rich ore. H. W. Hutton, a lawyer of San Francisco, has the Crystal mine bonded, and is shipping ore. Robinson & Son are also getting good returns from ore shipments. Fritz Groner and Bill Richter recently discovered a silver mine about a half mile from Mr. Ludwig's house. The ledge showed three inches of Chloride silver on the surface and assayed \$34 to the ton. A big and rich ledge is expected upon sinking.

NEW COMPANY.—The Cross Bow Gold Mining Company, whose mine is located near Middle Creek, has incorporated with a capital stock of \$500,000. The directors are Alexander R. Becker, Arnold Becker, Henry D. Walker, J. F. Leicester and L. A. Washburne. A ten stamp mill will soon be erected.

Sierra.

AROUND SIERRA CITY.—Mt. Messenger, Jan. 30: Water is rather limited at the Young America, necessitating stoppage of some of the stamps. Cleanup for past month to 15th inst, \$7000.

ARTIC PLACER M. Co., at Howard Creek, is driving a bedrock drain tunnel night and day, with all possible vigor, to open an extensive gravel bed, a mile in length and a depth of 50 feet. Surface gravel paid Portuguese \$1 a day, and when the tunnel is completed the owners think the ground ought to yield \$100, daily, with only four men employed.

Siskiyou.

QUARTZ.—Yreka Journal, Jan. 27: Myron Canrick and K. McPherson, who have a good ledge of quartz on Greenhorn, had seven tons crushed lately at the quartz mill on Humboldt, which realized \$40 a ton. Owing to the deep snow at their claim, they postponed further prospecting until spring, and should it continue to prove as extensive as present indications predict, will put up a mill at the mine.

FAVORABLE.—The cold dry weather lately has not been very favorable for mining, as it keeps the streams frozen, and water is not turned into ditches for fear of choking up with ice. There is just enough frost every night to freeze the snow, so that the hot sun during the day has but little effect upon it in the shady gulches and timbered forests covering most of the mountainous sections.

THE ENGLISH COMPANY.—When the English Co. which has recently purchased the Campbell hydraulic mines in Quartz Valley, commences operations, we may anticipate lively times in that locality, to create a boom in mining, and at the same time be of great benefit to the farming community and business men in the way of furnishing supplies for the large number of men to be employed.

Trinity.

RAIN.—Trinity Journal, Jan. 30: The miners in this county are joyful over the present prospect of a good mining season. The snow is being trans-

formed into water on the lower hills and every little storm deposits more snow on the high mountains. The fall during the past week measured 1.46 inches. Total to date, 18.23. This is more than the average fall for this time in the season. In 1891 only 8.69 inches had fallen and still the miners had a good season, as the fall came in such amounts as to be easily handled.

NOT SO BAD.—The damage to the Chloride quartz mill on Canon creek is not so great as was first reported. The building is a total wreck but more of the machinery is left than was expected. Probably \$1000 may repair the damages.

Tuolumne.

BONDED.—Tuolumne Independent, Jan. 30: The Engelke mine, on Experimental gulch, was recently bonded by a company consisting of T. B. Valentine, W. G. Whorf, and others. The mill has been idle for some time because no water could be had. The water reached the mill last Saturday evening, and work was commenced at once. The vein is several feet in width, with limestone hanging wall and slate foot wall. The quartz is full of iron, which looks like it had been melted and fused. The vein is only about 40 feet from the surface. Tunnels have been driven a little over 100 feet north and south and stopes raised in each. The mine has never been worked in a way that would demonstrate its value. Whorf is now superintending the work. He has put in a Woodbury concentrator, and will mine and mill enough of the ore to demonstrate to a certainty its average value. Assays have shown that some of the ore goes into the hundreds per ton. Mr. Whorf trusts nothing, however, but a milling test.

UNDER THE LAVA.—Gus Weidekind has been tunneling under a deposit of lava in Experimental gulch, above Columbia, over six years. No one knows whether his work has been profitable except himself, and he is very reticent in regard to the matter. Experimental gulch, however, was very rich in placer gold, both above and below Weidekind's claim. It was probably one of the richest in the world. At the time it was mined nothing was known of dynamite, and the cemented lava was too hard for picks or black powder to have any effect upon it. Several miners attempted to find the channel before Weidekind secured the property. They drifted into the mass from the east side, and found numerous nuggets of pure gold, from 50 cents up to over \$100 each. But no bed of gravel was found. Mr. Weidekind recently drifted in near the upper side of the knoll, and last Saturday found a streak of gravel. He prospecting it as soon as he got into it a few inches, and got 40 cents in coarse gold in the first pan. It now looks like he had found the main channel he has so long been searching for; and if he has he will probably be richly repaid for his work.

NEVADA.

Washoe District.

CON. CALIFORNIA & VIRGINIA.—Virginia Enterprise, Jan. 23: 1100 level.—The crosscut, No. 2, running west from the main south drift, 40 feet south from east crosscut No. 4, has been advanced 45 feet; total length, 145 feet in a porphyry formation. 1500 level.—At a point in the old south drift, 155 feet south from the old shaft station, a west crosscut was started and has been advanced 36 feet. From the end of this crosscut an upraise has been carried up 10 feet. 1600 level.—Have been retimbering and repairing the main south drift on this level, and are continuing the work of prospecting upward from the sill floor. 1650 level.—Have continued to extract ore of fair quality, and from the drift run west from the top of the upraise carried up 50 feet above the southwest drift. 1750 level.—In working out and upward from the bottom of winze No. 2, sunk from the 1650 level, we continue to extract ore of fair quality. There has been extracted from all parts of the mine during the past week 1,017 1510-2000 tons of ore, which was shipped to the Morgan mill. The average assay value of the ore worked at the mill during the week (980 tons) was \$32.48 per ton. Bullion shipped to Carson Mint, assay value, \$28,317.59.

OPHIR.—1465 level.—From the drift run west from the winze 122 feet below the sill floor of the 1300 level, 80 feet west from the mouth of the drift, a north drift was started and has been advanced 20 feet in porphyry and quartz formation, which carries a low assay value.

MEXICAN.—On the 1465 level the crosscut started west from the bottom of the winze sunk 101 feet down from the end of the crosscut run west from the main north lateral drift near the south boundary line of the mine, has been advanced 9 feet; total length, 48 feet; face in very hard porphyry. From the bottom of the above mentioned winze, opposite the west crosscut, an east crosscut has been advanced 18 feet, and is in a favorable looking formation.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. south lateral drift from the main west drift, at a point 1570 feet in, has been extended during the week 23 feet; total length southward, 102 feet; face in quartz giving low assays.

GOULD & CURRY.—200 level.—East crosscut No. 4 from southeast drift No. 2 has been advanced 24 feet through porphyry; total length, 106 feet. 65 feet above 200 level.—West crosscut No. 3, 165 feet north from upraise No. 2, has been advanced 22 feet; total length, 87 feet; face in porphyry, clay and quartz. 350 level.—West crosscut No. 1, from top of upraise No. 2 from 400 level, has been extended 20 feet through soft porphyry and stringers of quartz. Opposite west crosscut No. 1, started east crosscut and advanced same 20 feet in porphyry and quartz. On the Sutor tunnel level the joint north drift with the Savage is advanced a distance of 135 feet, the drift having been extended 95 feet previous to resuming work there; face in porphyry.

BEST & BELCHER.—900 level.—At a point in north drift, 1000 feet from top of upraise from 1000 level, started a west crosscut No. 1 and advanced same 30 feet through soft porphyry and stringers of quartz.

Tuscarora District.

NAVAJO.—Times-Review, Jan. 29: South intermediate drift below the 350-foot level has been extended 7 feet; the vein continues small. South intermediate drift extended 6 feet; ore not so high grade.

COMMONWEALTH.—Fourth level.—Joint raise from No. 2 south intermediate drift has reached 2d level, distance 105 feet in the vein, exposing ore about 12 inches wide, some of which is good grade, assays from \$18 to \$160 per ton.

NORTH COMMONWEALTH.—Hoisted 52 cars of 2d class ore; car sample assay \$56 per ton.

BELLE ISLE.—No. 1 winze, No. 3 vein, extended 10 feet, showing good ore in the bottom. Have started a winze on No. 1 vein, 250-foot level, which is showing some very fine ruby ore.

NORTH BELLE ISLE.—A crosscut has been extended 14 feet westerly from the north end of No. 3 drift, 400-foot level, through vein matter, cutting a seam of good ore on the hanging wall. No. 3 upraise, on same level, extended 8 feet, still in good ore.

DEL MONTE.—Second level.—No. 1 raise from west drift reached the ore at 30 feet; it is good ore, assays \$79.13 per ton. Started drift under the ore to connect with the line stopes; face of drift is in 19 feet, with some ore in top, distance through to stopes is about 50 feet. Extracted 61 cars of ore.

NEVADA QUEEN.—Second level.—No. 1 south drift has been extended 20 feet in hard porphyry. No. 1 raise from No. 1 south drift has reached the hanging wall, the vein being 21 feet between the walls, all of which give low assays of \$3.65 to \$30 per ton.

ARIZONA.

PROBABLE ACTIVITY.—Arizona Journal-Miner, Jan. 30: The year 1892 promises to be the most prosperous in regard to mining of any year in the history of this country. One of the best evidences to base this prediction on is the fact that during the past year a very much greater number of affidavits of assessment work has been filed for record than in any single year previously. A larger number of claims are also being patented than at any time in previous years, no less than 37 plats of mining claims having been filed in the United States Land Office this month, preparatory to the claimants making their applications for patents, while several other surveys of mining claims have been made. One or two mining sales of considerable importance have already been made this year, while there are a number of others under negotiation, with prospects favorable for their consummation. That the prospect for building the S. F. & P. Railroad has been largely instrumental in causing this activity there can be no question, and with active work now commenced, a still greater activity will result from it. There are very many claims contiguous to the line of this road which could not be worked heretofore on account of the exorbitant rates of transportation that can be made to yield large profits with the construction of the road, and which will also contribute largely to the traffic of the road.

SILVER.—Tombstone Epitaph, Jan. 29: With free silver, the Comet mine in this district will prove to be one of the most valuable. Its ore body is almost inexhaustible, and an additional 55 per ton value given it by a free coinage bill would place a profit of \$15,000 per month into the coffers of the owners on a basis of what it can do at present.

LYNX CREEK.—Prescott Courier, Jan. 30: The Lynx Creek Gold and Land Company, under the management of Messrs. Barlow-Massicks and Pedley, have expended a great deal of money in their Lynx Creek enterprises, and are now only in need of water to commence operations on a paying and extensive scale. It is authoritatively stated, also, that the Lynx Creek dam will be rebuilt.

SHELTON.—Sam Dennis came in last evening from the Shelton mining group, says 100 tons of ore from those mines have been successfully run through the Clark & Adams quartz mill in the last 12 days, and that work has been temporarily suspended on the mines, owing to trouble in packing ore over the snowy divide and the great difficulty in keeping sufficient hay at the mines for horses to live upon.

BRITISH COLUMBIA.

SLOCAN CLAIMS CHANGE OWNERS.—Nelson Miner, Jan. 30: During the week a number of Transfers of claims situate in Slocan district have been placed on record at Nelson, all the purchasers being Americans. Price McDonald realized \$2500 by selling the Eagle and Seattle, getting \$1500 for the former and \$1000 for the latter. H. G. Bond of Seattle took all of the Seattle and two-thirds of the Eagle, the other third of the Eagle going to G. B. Wright of Tacoma. Mr. Bond also purchased the Lucetta from E. E. Fletcher, paying \$1500 therefor. Thos. Trenery cleaned up \$1000 for his interests in the Wellington, Jay Gould, Eureka and Perhaps, being an eighth in the first three named and a half in the last named. The man who paid the money was L. C. Dillman, the well-known Spokane real estate dealer. This goes to show that men with money believe the reports of the wondrous richness of the discoveries made in Slocan, for neither of the purchasers have seen more of their properties than a picked specimen or two of ore.

THE FACE OF A DRIFT IN SOLID ORE.—Superintendent Robertson reports the south crosscut from the Grizzly tunnel in 20 feet, with indications that the ledge is not far distant. He also reports that the face of the south drift from the Dandy crosscut tunnel is in solid ore, and that the property never looked better. The average progress was made during the week in the Silver King tunnel, and it is now in a total of 760 feet.

THE SILVER QUEEN STOCKED.—J. E. Boss has returned to Spokane from Montreal, where he succeeded in placing the Silver Queen, the south extension of the Kootenay Bonanza, on Toad Mountain. The new company is known as the Silver Queen M. Co., and its stockholders are among the solid men of Canada's greatest commercial city.

COLORADO.

THE MINING OUTLOOK.—Denver Republican, Jan. 28: The year 1892 has opened with a very promising outlook for mining in this State. There are indications that there will be more work done in the mines than in any previous year, and that prospecting will be more active than it has been since the decline of the excitement which grew out of the discoveries at Leadville. The old camps like those in Clear Creek and Gilpin counties, and like Leadville, Aspen and the towns of the San Juan, will in all probability make as good a showing as they did last year. In some cases, the output will probably be greater. There is plenty of mineral in the Aspen district to admit of the enlargement of the output of that camp, and there may be considerable growth in the Red Mountain district near Ouray. What

makes the outlook exceptionally bright is the discovery of ore at Creede and Cripple Creek. These two camps are of themselves capable of making this an exciting year in mining. They are booming now, and yet they were hardly talked about by the general public when the Silver Convention met here last November. People are going into each place at the rate of about one hundred per day, and this is likely to keep up until the first snow comes next fall. There is less definite information about Cripple Creek than Creede, for there has been more development at the latter. Besides, it has a railroad, and this makes it easy to reach the camp, as well as to ship ore out; but if the result of work at Cripple Creek shall justify it, the Midland will soon build a branch from its main line to that place. The Cripple Creek prospects seem to be chiefly gold claims, and the other day a strike was reported to have been made there in wonderfully rich ore. It is a railroad ride of only about six hours from Denver to Florissant, where the stage starts for Cripple Creek. The stage ride occupies about six hours more; so that one can go from Denver to Cripple Creek in a day. Some of the enthusiastic believers in Creede think it will indeed be a second Leadville, and there seems to be a good deal to justify their hope. It is certainly a wonderful place, and it is in the midst of a district which is enormously rich. It is rapidly advertising itself, and its fame is likely to extend all over the Union in the course of a few months. It is already a heavy shipper of ore, and long before the summer is over, the shipments will probably be doubled. Creede seems to present opportunities for making money very similar to those that were seen in Leadville in the early days.

IDAHO.

TRADE DOLLAR.—DeLamar Nugget, Jan. 25: They are whooping things up at the Trade Dollar on Florida mountain. The air drills are doing rapid work in enlarging the Blaine tunnel and fans, and a new 15-horse power engine to drive them is now on the way in, so that work on that tunnel, which will take six or eight months to push under the Trade Dollar ore shoots, may be pushed as rapidly as possible. The track has been laid into the new ore house at tunnel No. 3, and the first carload of ore dumped into it on Saturday.

BULLION.—Eight bars of bullion were shipped out by the DeLamar Mining Co. on the 20th inst, and six more followed to-day, making, with the shipment previously reported by the Nugget, this month, 22 bars averaging slightly over \$2000 each in value.

SNAKE RIVER FINE GOLD.—Idaho Falls Times, Jan. 25: For a great number of years placer mining has been conducted along the Snake river, and probably in no place in the world is there another as great a deposit of fine flour gold as there is in the valley of this stream. Mining has been successfully carried on from Idaho Falls down to a few miles below the high bridge of the Oregon Short Line, a distance by stream of nearly 400 miles. Above the bridge for about 70 miles there are only a few inches fall to the mile, and while the bars on each side are rich in gold, the difficulty of getting water on them is such a great obstacle that comparatively little mining has yet been done. At all points where water can be secured in abundance there is undoubtedly good pay in store for judicious mining. Glenn's ferry is at the upper end of the sluggish portion of the river, about 100 miles from the Oregon Short Line bridge. Above the ferry the stream has a heavy fall most of the way from its source. Several machines are kept in operation in the season at the ferry and are said to pay handsomely. Between Shoshone Falls and American Falls various parties have placed in large wheels and are taking the water from the river, and are realizing large profits. With all the canals that will soon be taken out of Snake river, the water will be lowered so that miners can work the center bars at great profit. It is not unreasonable to expect a return of the California days of '49. The bed of Snake river is lined with gold, and all that is needed to successfully operate it is to reduce the flow of water from the stream by means of canals. Idaho will yet take the lead as the gold producing State of the Union.

LOWER CALIFORNIA.

SILVER MINES.—Lower Californian, Jan. 26: On the last trip of the Emma down the coast, her skipper again made a journey across the Peninsula to the San Juan silver mines, and from him we learn that the mines situated on Los Angeles bay are turning out very rich ore, and at present the company owning them has seven mines located—the San Juan, Coronado, Consuelo, Picacho, San Pedro, Ventura and Creston. The six last named are only small workings as yet, but the San Juan is now 267 feet deep, having two tunnels and four shafts. This entire group of mines is located on the San Juan mountain, and the company is now running a tunnel through the base of the mountain, commencing at both sides. This tunnel will crosscut the different ledges at a depth of 600 feet or more, and when completed will have a total length of 2400 feet. The company is daily expecting a large vessel from San Francisco, with material for the tramway to be constructed from the summit of the San Juan mountain (5000 feet above the sea) to Las Flores valley, where the reduction works are located. It is expected that the capacity of the mills will be increased upon the completion of the tramway, which will be two and a half miles long and of the Hallidie system. Las Flores, where the mills are located, is becoming quite a thriving little town, and already contains 300 persons, while at the mines 100 men are employed.

ALAMO ITEMS.—The Princess is well started in drifting on the new vein at the 200-foot level. The work is done with the Burley air drill and full shifts of men. The San David boiler, the largest in the camp, has been moved over to the Princess mill, and as soon as arranged the mill will start running night and day. It is the new vein will supply enough rock to keep the mill running constantly. The Aurora is working as usual, although the output of quartz is not very large. The mill runs 15 hours and would run night and day if water could be obtained. The tributaries on Aurora ground have a good thing on some rich stringers. The Sheldon mill runs the whole 24 hours on La Flor rock, and the French company is doing well. The Manzanita mill has been running continuously on custom rock, mainly from Mexican mines and prospectors

have very good luck in finding small lots of rich quartz.

MONTANA.

DULL.—Phillipsburg Mail, Jan. 28: While it is evident that the mining industry is being pursued with the usual vigor in the Flint Creek district this winter, the matter of gleaming live mining news is dull as usual at this season of the year. The hills and gulches are heavily covered with snow, making it impossible for the prospector to make new discoveries. Work on the larger prospects, such as the Bi-Metallic Extension, Fanny Parnell and others, is pushed on energetically with every hope for ultimate success, and of the numerous claims worked under a lease many of the operators are taking out and shipping ore right along.

THE BI-METALLIC.—It is now evident that the Bi-Metallic mill will be shut down entirely until the new reel shaft arrives and is put in position at the mine. About half the mill hands have already been laid off, and before the close of the present week several more will be given a rest until operations are again under way at the mine. It is thought that the shaft will arrive some time next week, and within 15 days all the works will be under way as usual, therefore the effect of the shutdown will scarcely be noticed. In the meantime the mill will be given a thorough overhauling and repairing, so that when the hoist can run again the reduction works will be in first-class trim.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City Enterprise, Jan. 27: A contract has been let for 400 feet of development work on the Ann Arbor on Silver creek. The old Custom mill at Gold Hill will be started up on ore from the Reservation next week. The Grand Central of Central district is now showing seven feet of solid ore, two and one-half feet of which is said to average \$500 per ton. Mayor A. J. Spaulding and Col. R. S. Allen, who have been doing some very hard work on their mine in the north-west corner of Central district, are being well rewarded for their labor. They are now down about 40 feet, and have a two-inch streak of almost "pure truck," as the Colonel expresses it. It is one of the most promising prospects now working in this section.

OREGON.

SILVER BRICKS.—Bsdrock Democrat, Jan. 27: The First National bank was visited by a large number of people yesterday, drawn thither by the exhibition of the large silver bricks from the Morris mine at Greenhorn, the result of 25 tons of ore reduced at the Monumental mill. Gold bricks are of frequent occurrence here and usually create no special interest, but silver bricks are a rarity. The output is the first from the Greenhorn section, a new camp. The success attending the working of the Greenhorn ores in the Monumental mill, superintended by Mr. C. S. Miller, is important and gives assurance of great results the coming season, or as soon as the snow disappears, allowing the mine owners of Greenhorn to transport their ores to the mill. Not alone will the Morris mine contribute ore to the mill, but there are many other properties undergoing extensive development this winter.

PROBABLE LITIGATION.—The past few days have developed the report that there is liable to be trouble over the ownership of the celebrated White Swan property, and that the courts will be appealed to by one or more persons in the attempt to gain possession of the property, or make it an object to the parties now in possession of the mine to recognize the rights of the contestants.

RICH STRIKE.—Within the past few days since the water in the Virtue mine has been lowered below the first level, admitting an examination of the ore vein exposed, Superintendent Oliver has been prospecting the body of ore and finds it to be exceedingly rich. Last Saturday, in knocking down a few pieces from the ledge the quartz was literally covered with gold and several specimens were brought to this city by Mr. Oliver. From present indications there is every assurance that the new company operating the mine has a bonanza and it is almost a certainty that it will be justified in working the property on a more extensive scale than ever before known, even in its palmiest days.

UTAH.

NOT CLOSED DOWN.—Park Record, Jan. 30: It transpires that the Record's information concerning the closing down of the Morning Star mine until spring was an error, for the property is now being worked with greater activity than ever, with increasing prospects of becoming a large and rich shipper early next summer. It seems the mine only suspended operations for about ten days during the holidays, and as soon as the boys employed at the mine got through celebrating, work was again resumed with redoubled energy and is being prosecuted without interruption.

AT THE LUCKY BILL.—Matters at the Lucky Bill are assuming a very encouraging appearance, and the indications are that the property will show up a fine body of shipping ore before the snow is gone in the spring. Early this week, while cutting a station on the 300 level, a seam of fine vein matter was encountered, in fact it was ore, and shows that the shaft is getting very close to the big chute of ore in the old shaft.

WASHINGTON.

STRIKE IN THE ST. CLAIR.—Okanogan Outlook, Jan. 27: Dudley and Hanway made a very promising strike in the St. Clair yesterday. They were sinking an incline shaft on what they supposed was the foot wall of the ledge, but which proved to be only a seam in the formation. They discovered their mistake yesterday and demonstrated that instead of being on the foot wall they were gradually approaching the hanging wall, and were working right on top of their ore chute. Yesterday afternoon while showing some visitors over the property, and prying about with a pick in the bottom of the shaft, they dug out some handsome pieces of brittle silver and black sulphure ore. They investigated the discovery enough to satisfy themselves that they were working above the ore chute, and will change the dip of their incline shaft so as to prospect the chute and eventually drop back onto the foot wall.

SCIENTIFIC PROGRESS.

Dynamite to Give Place to Electricity.

Edison would not be the wizard that he is said to be if he did not announce something new every few days. He now proposes as a means of defense or attack in war to devise a way by which electricity may be poured out from a hose upon an enemy as water is thus thrown out under great pressure. He says that with 25 men in a fort, he could make any fort absolutely impregnable, so far as an assault is concerned. This is not guesswork, but a matter of scientific certainty.

WATER AS A CONDUCTOR.

"Some years ago," he said, "when the wires loaded with heavy electric charges began to go underground, I predicted that there would be danger of the firemen receiving a deadly shock by the electricity running down the streams of water which might cross the wires. In each fort I would put an alternating machine of 20,000 volts capacity. One wire would be grounded. A man would govern a stream of water of about 400 pounds pressure to the square inch with which the 20,000-volt alternating current would be connected. The man would simply move this stream of water back and forth with his hand, playing on an enemy as they advanced and mowing them down with absolute precision. Every man touched by the water would complete the circuit, get the full force of the alternating current and never know what happened to him. The men trying to take a fort by assault, though they may come by tens of thousands against a handful, would be cut to the ground beyond any hope of escape.

MIGHT MERELY STUN THEM.

"Foreign soldiers undertaking to whip America could walk around such a fort, but they never could get through it. It would not be necessary to deal out absolute death unless the operator felt like it. He could modify the current so as simply to stun everybody, and might then walk outside his fort, pick up the stunned Generals and others worth keeping for ransom or exchange. He could also make prisoners of the others if he chose to do so."

FAULTY LANDSCAPE PHOTOGRAPHS.—It is well known to those informed in such matters that very few landscape photographs are correct in perspective. It is laid down as a rule by those well skilled in such kind of photography, that any photograph taken with a lens of less than about a foot focal length must exaggerate all the distances, or make objects in the picture look smaller than they should. The only remedy for this is to enlarge the picture until the right distance to view it from becomes also the convenient distance. Even if this be done, however, there is a tendency still to view the picture too far off; for few lenses, except those for portraits, embrace an angle so small as to be taken in a single glance, and people are naturally inclined to stand far enough from a picture to see the whole of it at once; still, a proper amount of enlargement offers the best means of making a photograph give a true idea of the scene which it represents, this being especially true of the small pictures taken by the so-called detective cameras, having lenses varying from four to six inches in focal length, and for which the enlarging process would be particularly useful.

A PECULIAR CHARACTERISTIC OF GOLD consists in its strong cohesive properties. If we take a sheet of gold foil and let it fall upon another it will be so firmly fixed that it cannot be removed. The pressure of the atmosphere upon the upper surface and the approximate vacuum between the two surfaces have some effect; but other experiments show that there is something beyond that—that the two pieces by thus coming easily together are actually welded. No other metallic surfaces thus brought together manifest any such cohesive powers. It is this peculiar property that makes gold so much preferable to any other metal for dentist's use. But for this peculiarity of gold, silver would no doubt be much used in dentistry as a cheaper material. But its adherence is quite limited, while the gold used in filling a tooth is actually welded together and fills the cavity just as completely as though it was melted and run into it. Two comparatively thin pieces of gold, with even surfaces, may be welded together by a very little pressure, applied by running the pieces between two rollers. Gold is thus welded to sheets of silver for the manufacture of cheap jewelry.

THE MICROSCOPIC STRUCTURE OF STEEL was recently discussed at a meeting of the

Amsterdam Royal Academy of Sciences. M. Bebrans stated that under high powers of the microscope, the network in hardened steel may be made visible on polished slices without etching or annealing—the dark, sinuous lines answering to the bright ones shown by Sorby and Wedding on etched slices. It is proved that hardened steel contains hard granules bound up in a matrix of soft iron. Some varieties of gray iron from small castings may be hardened like steel, most of the graphite disappearing. After annealing the metal at a red heat, however, the slices were dusted with a dark-colored dust and the graphite seemed to have reappeared.

INDUCTIVE LIGHTS.—At the meeting of the American Institute of Electrical Engineers Mr. Tesla employed a machine having 400 poles, which, when run at full speed, enabled him to obtain 20,000 alternations per second. He believes that electro-magnetic waves cannot produce luminous effects unless they have the frequency of true light waves; but this is not the case with electrostatic waves or thrusts, as these can excite luminous radiation no matter what their frequency may be. He made many experiments with Geissler tubes, and also with lamps in which only one terminal was used. The filament consisted of a single rod, which was in a nonstriking vacuum. The energy was transferred entirely by condenser action through the coatings in the base of the lamp. He also showed how exhausted tubes could be made to glow in an electrostatic field, so that if such tubes were merely hung up in a room in which such a field was produced they would be lighted up, and could be moved about at will. These experiments created the most intense interest, and point to methods of producing light which may be used in the future.

CHEMICAL HEAT.—The North of France Railway Co. is about to experiment upon a method of warming its cars by chemical heat. The heat is to be derived from acetate of soda. That chemical will be placed in boxes in a solid state and then immersed in water at 100° F., thus liquefying the soda. The heat will be obtained by the process of the subsequent solidification of the chemical, which will gradually take place after the boxes have been taken from the water. This process can be repeated continuously, each immersion requiring from five to six hours' time to solidify. If such results are possible of attainment, why would it not be a convenient, cheap and safe way of warming conservatories during the winter months, especially in the comparatively warm climate where but little artificial heat of California, is required, and that seldom needed during sunny days?

A NEW SOLVENT OF CAMPHOR.—From the frequency with which the indications for the subcutaneous injections are met with, it is evident that a good and reliable solvent for this substance is a great desideratum. Ethereal solutions rapidly evaporate. Alcoholic solutions also evaporate, and the camphor becomes precipitated, so that injections of such solutions produce severe pain or even abscess. Solutions of camphor in oil are difficult to employ, while besides possessing the disadvantage of the liability of becoming rancid. In the *Zeitschrift für Therapie* for September 1, 1891, Dr. Karl Rosner recommends in the highest terms a solution of camphor in liquid paraffine, which, when slightly warmed, forms a perfectly clear and limpid solution. He states that he has kept this solution for more than five years without its properties becoming changed.

AN IMPORTANT ANNIVERSARY.—An impressive ceremony took place at Bordentown, N. J., on Nov. 12th last, on the occasion of the completion of a monument erected to mark the spot where, 60 years ago, the first piece of track was laid on the road built to connect New York and Philadelphia with the iron rail. This work was the real inauguration of the present great railway system of the United States. The English locomotive, John Bull, the first regular locomotive ever put upon a rail in this country, was put together at this place and first placed under steam on this road.

THE KEYNOTE OF AN AUDITORIUM.—In rooms of poor hearing qualities Dr. Ephraim Cutter says: "Every hall or church has its keynote, and the audience will bear better if the speaker's voice is pitched and held to the keynote of the room. To find the keynote sing the natural scale slowly, evenly and smoothly, or play this scale on piano or organ. The note which is most prominent is the keynote."

IN AUSTRIA, experiments are being made with the view of replacing steam by electricity for rapid, long-distance railroad travel.

MECHANICAL PROGRESS.

DON'T MAKE A MISTAKE.—Some engine makers are turning their attention to the manufacture of dynamos. One who is thoroughly acquainted with the latter, offers to such the following words of caution: "This is a work which requires most careful consideration, and no doubt those who have taken the step have given it such. Dynamo making does not simply consist in winding various sized iron bars with wire. There are many important considerations beyond those which appear on the surface, before an efficient dynamo can be made. Firms like Crompton & Co., Siemens Bros. & Co., The Brush Co., and others, have been for years studying the construction of dynamos in every detail, and the best machines of the present day are showing an efficiency of 94 and 96 per cent. Engine makers who wish to extend their business by introducing dynamo making should at least take the precaution of employing only competent workmen, with managers who have had years of experience in practical dynamo building."

FLEXIBLE METALLIC TUBING.—A new flexible tubing, which is made entirely of metal, disposed in a very ingenious manner, is being introduced by a London firm. The tubes are produced by a machine from strips of metal of the required length, width and thickness. These strips, in passing through the machine, are corrugated longitudinally with a large and a small corrugation side by side. The tube is formed by the corrugated strip being coiled spirally round a mandrel in such a way that the small corrugation enters and interlocks with the large one, and forms what is known as a piston joint. Formerly, this kind of flexible tubing was made steam and water tight by means of a strip of india rubber inserted in the interlocking corrugations. This tubing, it is said, answered well for many purposes, but in some cases the substances passed through, caused the india rubber to deteriorate.

A SIMPLE, HIGH SPEED, STEAM MOTOR not requiring the constant care of an expert hand, is a great desideratum which it is thought has been quite fully realized in an apparatus described as follows: The cylinder is contained in a cylindrical casing, which rotates in the short arc of a circle as the crank turns, and by so doing opens and closes the ports, thus practically dispensing with the services of valves. A rigid piston rod is, of course, utilized, and the bottom of the casing in which the machine is enclosed is filled with water, floating a layer of oil, into which the crank is dipped at every revolution. These engines are made in sizes ranging from two to 15-horse power, and some of the smaller ones can be run at 2000 revolutions per minute. The engine can be suspended from a beam like the hanger of a shaft.

ELECTRIC WELDING OF IRON WHEELS. Electric welding is now applied to the work of manufacturing iron wheels. The process of welding the hub, spokes and tire of a wheel is accomplished in 30 seconds. First the tire is laid on the machine, then half of the hub, which contains notches in which the spokes fit. The latter are laid in the hub and inserted in the tire, and then the other half of the hub is laid on top of the lower half. These are held together by hydraulic pressure. The electricity is turned on, the iron becomes heated to the proper degree and welds. The pressure is removed, the now compact wheel taken from its resting place, rolled aside and allowed to cool. The work is done in very much less time than it took by the old process.

A HIGH RECORD.—What is thought to be the highest record in the rolling of steel rails was recently accomplished at the Edgar Thomson Steel Works, Pa. During 24 hours, 1907 tons of rails were turned out, beating the record of the South Chicago rolling mills by 232 tons. The manager started out with the intention of turning out 1800 tons.

GUN METAL FOR STEAM WORK.—It has been demonstrated that gun metal is the best for steam. It is therefore a superior article for valves, as by simply regrinding the disk, or in any case by having the disk replaced, it can be made as good as new. Such is the opinion of one of our most experienced steam engine manufacturers.

SOLDERING ALUMINUM.—It is asserted that pieces of aluminum may be successfully soldered to each other and to other metals by using silver chloride as a flux in conjunction with ordinary solder. The metals, one or both of which are aluminum, are placed in the relative position required

in the joint, finely powdered fused silver chloride spread along the line of junction, and solder melted on with a blow pipe or other device. It is claimed that joints are thus easily and rapidly obtained, and become hard and perfectly sound in setting.

FINE MECHANICAL WORK.—Prof. Rowland of the Johns Hopkins University has recently manufactured a screw for his dividing engine, which is said to be more nearly perfect than any other of the kind that was ever produced. It is made of the best of Jessop's steel. It is 1½ inches in diameter and 17 inches long, and has 20 threads per inch. It was first cut in a lathe in the ordinary manner, and then ground by using a nut equal to it in length, which was placed on it with washed emery, and the screw revolved under a bath of water and oil maintained at a constant temperature. The grinding required about three weeks. It is to be used mainly in ruling gratings for spectroscopes, and it is thought will be capable of ruling a million lines to an inch! There are a thousand notches in the head attached to the screw, so that the movement of a notch advances the thread one-twenty-thousandth of an inch.

TO MAKE A BLACKSMITH'S FIRE WITHOUT SMOKE.—A correspondent of the *Blacksmith and Wheelwright* says: "Very often during the day a blacksmith's fire will go out several times, and in using wood to build it again the shop will become filled with smoke, thereby causing a loss of time. In such emergencies I pursue the following method: I have a quart bottle of kerosene oil always handy. I remove some of the coal, pour out a little oil, light it, work the bellows, put on coal, and in a surprisingly short time the fire is ready to work, with no smoke and very little time lost."

ALUMINUM is to be substituted for cast iron in the towers of some new public buildings at Philadelphia. There will thus be a saving of some 400 tons in weight, and the constant expense of painting will be avoided.

THE WOOD WORKER.

The Demand for Timber for Pulping.

The pulping process of treating wood it is thought will soon be found valuable for economizing scarce and valuable timber. The rapid disappearance of the large and slow-growing white pine in particular has become a well-known and solid fact. The pulp process is now employed as a means by which the smaller trees which it may be desirable to cut out, in order to insure a more vigorous growth for the larger, may be utilized by being reduced to pulp and pressed in molds into the sizes and shapes desired. At the present time such economy may appear ridiculous; but with the rapidly increasing rate of consumption of our valuable forest trees, and the increasing character and means for utilizing waste products, the above suggestion will soon become a matter of no inconsiderable importance.

A few years since poplar was in chief demand for the pulping process; but now only spruce is used to any extent. In the forests of New York the cutting of spruce is going on at a rapid rate. Very few have any idea of the immense amount of timber required by the pulping industry. It is claimed that in the Adirondacks three-fourths of the timber is spruce, the remaining one-fourth being hemlock and pine. The largest wood pulp mills in the world are on the Hudson river. One concern produces 55 tons of pulp a day all the year round. This is consumed largely by the New York daily papers. Another mill of the same capacity is being erected. The second largest mill has a daily capacity of 45 tons. The great pulp manufacturers of the Hudson require about 125,000 standard logs annually. A standard log is 19 inches in diameter and 13 feet in length. Notwithstanding the large amount of wood pulp produced in the State of New York, much more is turned out in Maine, where the industry first had its birth. Pulp mills are now being established in Washington, and a new draft will soon be made upon timber regions of the Pacific Coast.

In this connection a word may be said about the timber of Alaska. The *Post* of this city recently published an interview with a saw-mill man who is personally acquainted with that distant part of the country. He said: "I once ran a saw-mill there, and therefore know something about the timber. There are no large belts of timber there. The timber is in the gulches and lowlands. The land in Alaska rises up to a great height abruptly from the water, and the higher the land the sparser the timber. The hemlock is faulty and 'shaky' and not of large size. Then there is some spruce.

The most valuable timber there is the red and yellow cedar. This latter is by far the most valuable. I think it would pay to ship logs of it to Seattle, San Francisco and the East. It makes the finest kind of finishing for the interior of houses, and would make splendid desks and furniture. It has a beautiful color, works well, and has an aromatic odor."

A NEW WOOD PULP PROCESS.—Attention has recently been called to quite a new process for utilizing wood pulp: "The pulp is taken as it comes from the mill, and after first fully drying it or not, as circumstances may require, it is immersed in an indurating pickle, so called, with coloring if desired. This pickle is composed of any compound or solution capable of indurating the mass, and after the material is taken out of the pickle and thoroughly dried it is run through a mill and ground sufficiently fine to insure a mixture of the particles which have not absorbed the indurating substance with the particles which are fully hardened. The powdered pulp is then compressed with the application of heat in a mold or die, with the result of producing an article of manufacture composed of a homogeneous and cohesive mass of thoroughly indurated particles, and the objects thus produced may, if desired, be polished or japanned to improve the appearance of the same." Many useful and ornamental articles are manufactured from pulp so prepared.

COMPRESSED TIMBER.—Much attention is being given of late to compressing timber. It is compressed for various uses and purposes. Compression is now largely used instead of carving, and most beautiful and artistic designs are thus brought out, in many cases fully equal, if not superior, to anything which the carver can produce. Wood is thus compressed either in its natural condition or after being steamed. The hardest, well-seasoned ash timber, say four inches thick, can be pressed into about three inches without injuring the fiber. Wood can even be "upset" the same as iron. The increased tenacity of bent and compressed wood, as compared with the same in its natural state, is something surprising. Compression is now applied to spoke tenons. The work is very simple and rapid, the tenon properly tapered and ready to drive to its place. Spokes so prepared will never become loose, and an increased strength is said to be thereby added to the wheel equal to three additional spokes.

BLACK ENAMEL FOR WOOD.—The following recipe will prove of value to cabinet makers: Prime the wood with linseed oil, turpentine and white lead; then give it two or three coats of black, mixed with copal varnish and turpentine; rub it down dry with pumice stone and water; finally varnish with copal. Again rub down and polish with oil and rotten stone, to obtain a perfect smoothness.

ELECTRICITY.

Electrical Literature and Progress.

The rapid increase of electrical literature presents a remarkable and one of the most significant facts connected with the industrial progress of the day. A prominent electrical inventor recently remarked that about 20 years ago he had one of the largest electrical libraries in the United States. It consisted of five small volumes! One of the recent issues of the *Electrical Review* of New York contained a list of no less than 400 volumes of electrical books, which are now offered for sale in the bookstores of that city. Of course, all the books extant on that subject would scarcely be found in a single advertised list of such publications. Another significant fact in this connection is the great number of serial publications devoted to the subject of electricity. We have upon our table a greater number of exchanges exclusively devoted to that subject than are to be found devoted to any other industry or industrial subject known to the world.

Another significant fact is found in the large amount of attention which is now being paid to electricity by the general press throughout the country. The daily press of our leading cities, until quite recently, has, as a general thing, devoted a large share of its efforts to discouraging the growing zeal manifested by the public in regard to the practical value of this new factor in science and in industrial and commercial progress. Take, for instance, the daily press of New York City, which, until quite recently, as manifested by the character of their writings upon the subject, knew but very little or nothing upon the subject. We find that great "third estate" in influence

and power devoting all its energy in this direction to stemming the tide of the almost universal efforts of the technical and outside press to encourage the more general introduction of electricity as a substitute for gas in lighting, for a distributor of power for minor industrial enterprises, for traction on street railroads, etc.

But the solid facts of actual success, and the evident determination of the great body of the people that the wheels of progress shall not be hindered by the mouthpieces of capital and monopoly, has recently worked a wonderful change in the utterances of our metropolitan cotemporaries, and we gladly hail their present efforts to put themselves in line with the "more advanced journalism" of the technical press and of those whose eyes are never blinded with the dollars and cents of wealthy and influential patrons. Henceforward we trust that the startling headlines about the "deadly trolley" and the cartoons of exaggerated accidents will be left to the fruitful imaginations of such journals as derive their chief support from articles of a purely sensational character.

A year ago it was difficult to foresee whether our local authorities meant to undertake electric lighting in earnest or were merely dallying with the question in order to keep others from dealing with it. At the close of 1891, however, there can be but little doubt that municipal electric lighting has come to stay. In the meantime, the work of revolutionizing our various industries by the subtle agent which is just now so intensely occupying the minds of the most progressive and deep-thinking scientists and inventors among us, will still go on overcoming obstacle after obstacle until that which still appears wholly Utopian to the many will open out into the most perfect and simple reality—for of such is the destiny of progress.

ANOTHER SUBURBAN ELECTRIC RAILWAY.—The Pennsylvania Railroad Company is one of the most progressive and business-like railroad companies in the country. That company, with ample experience and capital, never undertakes any radical improvement without due study and experiment, where the latter is within reach. Soon after the application of electricity as a railroad motor became the general talk, the company applied the principle to a street railway belonging to them in Atlantic City. That road has now been in operation about three years, and that it has been fully proven practicable and economical is shown by the preparations which the company is now making to apply the system to an extensive suburban railroad between New York and Jersey City. Considering the character of the company, and its proposed application of the system in a new and more extensive quarter, the act may be regarded as one of the most suggestive innovations yet made for the electric motor. The route is level and straight, and will therefore admit of the highest speed attainable under the present condition of electric science. The system decided upon is that of dispatching cars either single or in twos at frequent intervals, as against the steam practice of making up long trains to be drawn by a single motor. This new road is to parallel their present road over the route indicated, and to relieve it of its heavy duty of short hauls, which will be vastly increased during and after the coming Chicago exposition. The necessity for this relief will be fully appreciated by the public, with the knowledge that the company proposes during the exposition to start hourly trains during the daytime from New York to Chicago. The enterprise will have an additional value from an engineering standpoint, from the fact that it will be the only road paralleling a steam road and upon the same grade, by which a perfect comparative test between steam and electricity can be made.

ELECTRICITY seems destined to invade the entire field of human activity. It has long been indispensable to the scientist. It goes without saying that the time is rapidly approaching when it will be found indispensable in all productive industries, whether in the shop, in the factory or on the farm, and in transportation, whether on land or water. It has already become fully established in the laboratory and in general medical practice. It is now moving toward "annexes" in the various specialties of medicine and surgery. Its latest move in that direction was into the field of optics, where it has come to stay, as well as into the dissimilar field of thermotics.

The slender vibrations of this wonderful agent of modern progress, to which attention of electricians is now being called, seems to be revealing the most bewildering possibilities in the way of telegraphing without wires, posts or cables, and with but a very few of the present cumbersome and costly appliances which have hitherto been re-

quired. It may be said in truth that the marvels of the future are fairly beyond any present imagination. The time appears to be really coming, which, as Dean Swift in a moment of wild imagination once observed, may be too fast for human endurance. Truly, already sufficient for this generation are the wonders thereof.

CHEAP TELEPHONES.—The day is fast approaching when it will be possible to make telephoning so cheap that the use and ownership of a telephone will be within the reach of almost everyone. A new system has already been introduced in Stockholm, by a new company, which charges only \$2.75 a year for the instrument and less than two cents for each telephonic message. In England the National Telephone Co.'s. patents having expired, many private firms have sprung up, which are installing central offices, and putting up private lines. Great strides are also being made in perfecting systems of communication. Such progress has already been made as will enable anyone to speak direct to another in the different rooms of a large house without having first to "ring up," and be "switched on," as is required by the systems heretofore in use. The cost of this system is very small, and can be put up in private houses for about the cost for placing electric bells. These instruments, it is claimed, will work at any distance within three miles. Cheap telephones will soon be available in this country as well as in Europe.

ELECTRICITY ON CANALS.—The canal boat drawn by horses did well, and was a decided improvement on horse traction over common roads, as employed 50 years ago. The canal boat propelled by steam, has shown much better results than the horse system, on the Erie canal during the last few years. But now that electricity has proven such a success on road motors, it is proposed to try it on canals also. Ex-Assemblyman Hickman, of Buffalo, has expressed his opinion on the subject as follows:—"With an 'up' wire and a 'down' wire, boats can be moved easily and cheaply. The room necessary for an electric motor is small and no fuel room is required. The weight of the motor is also small, comparatively speaking. One boat could tow another and the cost of transportation be so reduced that, even with low freights, boatmen could live. I believe this would be profitable with the present method of generating electricity, but if the Niagara Falls power scheme should prove a success, there would be a splendid return on the investment."

ELECTRIC RAILWAYS ON COUNTY ROADS, may soon accomplish a solution of the "road question." Such an idea is not so very unreasonable when we consider the progress that has been made in this direction during the last three or four years. The construction of electric roads, with their light motors and cars, is a very inexpensive affair when compared to steam road constructions over soft soil and level ground in farming districts where they are so especially needed. The conditions which are so unfavorable to the construction and maintenance of good farm roads for heavy traffic seem to invite cheap and light electric railways. It is quite within even the probabilities that before the expiration of the present decade the farmers throughout the broad prairies of the West and those occupying the great level valley near the Pacific Coast will be sending the bulk of their produce to market speedily over electric roads, at one-quarter the present cost of transporting them through rough and muddy common roads, by horse power.

AN ELECTRICAL MUTUAL FIRE INSURANCE COMPANY which has been doing quite a successful business in Boston, has turned over all its business to the N. Y. Home Insurance Co. This step has been taken in consequence of the great losses by fires during 1891, by which a large number of the minor companies have been brought to grief. The New York company with its ten millions of capital, has established a special department for losses from fires caused by electricity.

BIG FLOUR MILLS TO BE RUN BY ELECTRICITY.—Mention was made last week of the fact that what is to be one of the largest flour mills in the country is now in process of erection at St. Paul, which is to be run by electricity generated from a neighboring water power. We have since noticed that another immense mill is in process of construction at St. Louis, which is also to be run by electricity. The world keeps moving.

ELECTRICAL UTILIZATION OF WATER POWER.—A prize is offered by the Societe des Eaux et de la Dranse, in Switzerland,

for the best system for the electrical utilization of a fall of water. Particulars of the competition may be had from the Secretary of the Societe des Ingenieurs Civils, of Paris.

WOOD HEALTH.

How to Maintain Health.

It so often comes in the way of duty, as we regard it, to criticize the acts and policy pursued by the medical faculty of this city, that it is a real pleasure to offer a word of commendation, when the opportunity for so doing is presented. Such an opportunity is presented in speaking of the efforts of the managers of the Cooper Medical Institute, to impart general and valuable information in regard to health and how to preserve it, by the institution of regular annual courses of lectures at their hall on Webster street. It has been both pleasurable and profitable to the writer to attend these lectures from time to time. They are free to the public and are given monthly by the leading practitioners of this city, and are well worthy of being fully attended. Our present purpose is to make special reference to the last lecture, given by Dr. William Cushing, and reported for the *Call*, on

CIVILIZATION AS A CAUSE OF DISEASE.

The doctor maintained that to live in accord with the present idea of civilization it is impossible to conform to the laws of health; hence civilization and health are not cordial in their relations. The chief aim of study in the past has been to cure disease that has taken such fearful hold of civilization; the study of the future will be to prevent disease. The best means to that end will be to properly educate the people.

One of the greatest sources of evil in civilization is the use of stimulants; it has indeed come to be regarded as necessary. As a scientific fact, however, stimulants are not necessary.

No beverage in use is so hurtful as tea, particularly to women. It excites and shocks the nervous system and results finally in prostration. The tannin in tea is a poison that only serves to impede all the natural functions. Coffee is much less hurtful because it interferes less with nutrition.

ALCOHOL HURTFUL.

Alcohol is had in its concentrated form and the primary cause of a great many disorders. In its lighter forms it is less hurtful, and in some forms even beneficial if properly used. As it exists in malt and light wines it is an aid to nutrition and prevents the waste of tissue. The study of civilization should then be to learn the proper use of alcohol.

Tobacco has no redeeming qualities; it is had from beginning to end, and absolutely no good comes from its use. It impairs to a greater or less extent all the senses; but its chief evil is its hurtful influence on the heart and brain. It is particularly injurious when taken into the immature system. If people are determined to use it, the effect would be much less hurtful by waiting till after they are 21 years old.

Overeating is a dreadful vice of civilization. It takes into the system an excess of material that cannot be thrown off, and the inevitable consequence is the turning of that into poison, the chief agency of disease. People eat too much meat, too many varieties of food and too much trash, which moves in genteel society under the alias of "pastries." Meat once a day is usually enough for any one, and there is no better specimen of health than the ruddy German, who is glad to get it twice a week. Too much food results in fatty degeneration.

EATING TOO FAST.

An evil hardly less hurtful than overeating is fast eating. This, too, is one of the pernicious products of civilization. People not only eat too fast, but they live too fast, and the extra energy they expend is taken off the end of life.

The fast living of civilization causes riot among all the natural functions. The nervous system becomes irritated and weakened till it can no longer resist fatigue. Then disease takes hold.

Contagious diseases are peculiar to civilization. Consumption, scarlet fever, typhoid fever, cholera, smallpox and others, all contagious, are rare among the aborigines. They are in the great majority of cases the result of drinking impure water.

The cure of all this is the education of the people. Every school in the land should have one or more competent teachers of hygiene. For every dollar spent in building schools a like amount should be spent in providing proper means of physical training.

SUDDEN DEATHS.—It is claimed that eight men die suddenly to one such death among women.



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 Dividend Notice—Pacific Coast Borax Co.
 Increase Your Income—Box 1833, New York.
 Notary Public—Lee D. Craig.

☞ See Advertising Columns.

Passing Events.

The Anti-Debris Association seeing that the Miners' Association has issued a request to hydraulic miners to cease illegal operations until Congress can take action, has agreed to withdraw its watchmen now in the field. This is a most important step and one which will largely prevent friction, and bring about a better feeling between miners and farmers.

At Marysville, a petition was presented to the supervisors, asking them to donate \$600 toward paying the expenses of the Miners' Association delegates to Washington. The board allowed \$300 and the rest will be raised by subscription. This action, and that of the Anti-Debris Association, shows some of the good results accomplished by the recent convention toward a settlement of the long-continued controversy.

The action of the Board of Supervisors of San Francisco, referred to in another column, is greatly to be regretted, and makes this city look very "small" indeed. The idea that this great city cannot lend finan-

cial aid to a movement of such importance to its citizens and the entire State, seems almost absurd.

The proceedings of the River Improvement Convention Committee and those of the Executive Committee of the California Miners' Association, printed elsewhere in the PRESS, should be read by all miners, as they are very important, tending as they do toward a friendly settlement of the debris question.

Not One Idea Only.

Our friend Mr. Paul favors us with a communication on the subject of "The Two Conventions," in which he compares that of Denver with the one recently held here, saying that the San Francisco, unlike the Denver, was strictly "a one idea meeting." We happen to know from the California man who sent us the account of the Denver Convention that, outside of the silver question just 58 minutes in all was devoted to consideration of other subjects, lands, railroads, hydraulic mines and everything else. Knowing this fact, and having also read the proceedings, it does not seem that the Denver Convention went much outside of one idea after all. True, it adopted a hydraulic mining resolution—for which we are grateful—but it could not well do otherwise with a California man as its chairman and a California mining delegation present.

Mr. Paul says that in our State Convention "the land question was not touched in the proper spirit; railroad claims to mineral lands was given the go-by, and the silver question was ruled out." Mr. Paul is mistaken. The land question was touched upon to suit the convention, if not individuals; the railroad and mineral land question was referred to a proper committee; no silver resolution was ruled out because none was properly introduced. Those interested in the latter subject did not come before the convention with any resolutions, although the matter was talked of outside. It was perfectly competent for any delegate to bring up this or any other subject, if he cared to do so, and it would doubtless have received consideration.

As to silver, at Denver they had prepared themselves on the subject, and presented it elaborately to Congress, much better than it could have been done by a convention composed almost wholly of gold miners.

Mr. Paul infers that we had a lash over our heads in San Francisco, and did not dare to talk emphatically. He should be informed that the railroad grant matter, the drift mine subject, that of agricultural and mineral claimants, that of paying mineral, and others relating to legal matters, were by resolution referred to a special committee for more mature deliberation. Resolutions on these subjects were all drawn up, we are sure, since the writer of these paragraphs was one of those who devoted much time to their preparation. But it was thought best to refer them all to a competent committee, with legal knowledge, rather than take up time in discussing subjects requiring more thought and time than a convention could give them.

It is true that most of the work of the convention was devoted to the hydraulic mining question. But this is the most important one we have in California to-day. Except in the Klamath region, these mines have been practically closed for years. If, as Mr. Paul says, California only produces \$10,000,000 this year from all its gold mines; and if, as the hydraulic miners claim, the hydraulic mines can turn out \$10,000,000 a year; why then measures that will start them up will double our gold product at once. No other one thing could do this, that we are aware of. The quartz men are getting on fairly well, and their grievances are now under consideration by a special committee and will be brought to the attention of Congress at once.

As to Mr. Paul's expressed views about

the miner asserting his right and independence; standing square on his own feet; not admitting valley people into the State Councils, the tirades of the granger, etc. there is this to say: A few more besides Mr. Paul, who have been 40 years among the rocks, had these same ideas. If they had been impressed upon the convention, not one single thing would have been accomplished for the benefit of the hydraulic mines; there would have been no harmony, no concert of action between formerly-contending factions; no concessions on either side, nothing but a stirring up of old controveries; opposing interests contending before Congress; no results.

But, happily, what we consider wiser measures were adopted. The farmer, standing there with the law on his side, was invited to help, to cooperate and to advance plans for the miners' and his own benefit. Conferences were held, concessions made on both sides, and an amicable course of action carried out. Within a week the miners were asked by their own backers to stop illegal mining; the antidebris spies were withdrawn from the field, two committees of farmers and miners go to Congress with a common object; money to help the cause comes on; for the first time in years there is peace and unity of action; the press and the public give their assistance to the cause to which they had formerly been opposed.

All this has been accomplished by the course of action of the convention. Some men will hang back on both sides and refuse to join the love-feast, but most of them have that 40-year rock solidity—with some little moss naturally.

There was, once upon a time, a fight by another Miners' Association on this very question, carried out on the lines indicated by Mr. Paul. How that came out is a matter of history. It is not worth while to discuss it, but the results were such that the hydraulic miners are very glad to try "a new tack." And they are trying it.

Comply with the Law.

On pages 94 and 95 of this number of the PRESS are given the resolutions adopted by the California Miners' Association and the Committees of the River Improvement and Miners' Convention, requesting hydraulic miners to desist from any illegal mining until Congress can act on the mining debris question.

These resolutions were but the natural result of the action of the recent Mining Convention. They serve to prove the good faith of the new association, and to give notice to miners that the laws must be obeyed if hydraulic mining is to be rehabilitated.

There should not be any question on the part of hydraulic miners about complying with this request. Individuals cannot afford to fight this matter. If anything is to be accomplished in Congress, only an association of miners can do it. But the delegates to Congress from such an association will be placed in a very awkward position if, after they have pledged good faith, word comes on there that faith is being broken.

Neither the Miners' Association nor the mining press of the State can afford, or has any desire, to defend any man who, under the circumstances, continues operations after having been notified to desist. There can be no half-way measures in this matter at all. The issue is a square one and must be met. If miners care to go on and do as they please, they can expect no aid or countenance from the association.

Already the adoption of these resolutions has had a good effect. On Tuesday of this week, at Marysville, the directors of the Anti-Debris Association resolved that the Miners' Association, through their Executive Committee, have issued a request to hydraulic miners to cease operations until Congress shall take action whereby that class of mining can be resumed without injury to valley lands or navigable streams, the association having confidence in their good faith, deem it no longer necessary to have their watchmen in the field, and will withdraw them so long as the rivers show no evidence of a continuation or resumption of that class of mining.

The miners are placed on their honor in this matter. It only remains for the individuals to cooperate with the association to see the whole thing settled in due time and the mines go ahead legally. The withdrawal of the "spies" is a graceful act on the part of the Anti-Debris Association and an acknowledgment that they believe the Miners' Association is acting in good faith.

Mr. Ohleyer's Position.

Mr. George Ohleyer of Sutter county, well known to the miners of this State as one of the foremost leaders of the Anti-Debris Association, went from this city to Washington immediately after the Miners' Convention adjourned and before the meeting of the Executive Committees of the River Improvement Convention and California Miners' Association. This action has occasioned some adverse comment, because it was supposed that his prejudices would lead him to perhaps undo to some extent the good work accomplished by the friendly adjustment of matters previously in controversy.

In justice to Mr. Ohleyer, and to all concerned, it should be stated that he is not a delegate to Washington for the Anti-Debris Association—that Association is not sending any delegates—and Mr. Ohleyer is no longer drawing any salary from County Supervisors. He goes as a delegate of Sutter county from the River Improvement Convention to urge appropriations for improving the rivers. His expenses are paid by his county, just as Sacramento and San Joaquin pay expenses of their respective delegates. They were anxious to be in Washington as early as possible, and it happened that Mr. Ohleyer was enabled to go first. Since his departure the other delegates have gone, and in a few days the Miners' Convention delegates will also start.

The respective committees of the Miners' and the River Improvement Conventions came to an amicable agreement at their conference, and agreed to work together on a certain basis. This fact has been communicated to Mr. Ohleyer by telegraph and it is not likely, under the circumstances, that the gentleman will take any steps contrary to the wishes of the body which sent him on his mission. There need be no uneasiness, therefore, on the miners part, because Mr. Ohleyer is first on the ground. In fact, perhaps he is fairer-minded than he has been given credit for. At the Executive Committee of the River Improvement Committee meeting, some weeks since, Mr. J. B. Hobson introduced a resolution to the effect that they were not opposed to hydraulic mining, provided it would be carried on without detriment to other interests. To his surprise, it must be confessed, Mr. Ohleyer was one of the few who favored this and called it up. It was defeated eventually, but Mr. George Ohleyer was for it. He is a man of strong prejudices, and is a battle-scarred veteran—in a hydraulic sense—but will doubtless act, like the rest of his delegation, under the agreement adopted.

A Contrast.

The supervisors of Yuba county, at a meeting at Marysville, have appropriated \$300 toward paying the expenses of the delegates to Washington appointed by the Miners' Convention, and \$300 more will be raised by subscription; they gave the same amount to the delegates of the River Improvement Convention. This is one of the happy results of the amicable agreement between farmers and miners, brought about by the Miners' Convention. It will surprise many miners to think that any money could come out of Marysville—the antidebris headquarters—for such a purpose, and the supervisors of Yuba county are to be congratulated for their good sense in furthering the object by moral and financial aid.

In strong contrast to this is the action of the San Francisco Supervisors, who were also asked to aid the Miners' Committee. At a special meeting on Monday afternoon, a communication was read from the California Miners' Association setting forth the advantages of the resumption of hydraulic mining to this city and the State, and the Supervisors voted \$1000 toward defraying the expenses of the Miners' Committee to Washington. At the evening session of the same body on the same day, they voted not to give the \$1000, and declined to give anything at all. They had already given \$200 to the River Improvement Convention Committee to Washington. Gold from the mines has been pouring into San Francisco for 40 years and more, and this is the first time the city has ever been asked to do anything for the mines. We feel so ashamed of this action that we do not care to discuss it,

Good Air-Compressor Work.

The indicator cards illustrated herewith were taken from a vertical duplex air-compressor 16 inches diameter and 20 inches stroke, having a forged steel crank shaft

Timbering in Clay and Quicksand.

If the reader will turn back in his file of the MINING AND SCIENTIFIC PRESS to pages 61 and 62, Jan. 23, 1892, some examples will there be seen of methods of

widened out, the arch was carried to 778 + 05, and the invert and side walls to + 08, or the edge of the soft ground. The extent to which it had been honey-combed by successive drifts is shown in the engravings. Fig. 1 is a section showing drift No. 3,

subject of "Heredity in its relation to the inheritance of acquired character."

The Knight Water Wheel.

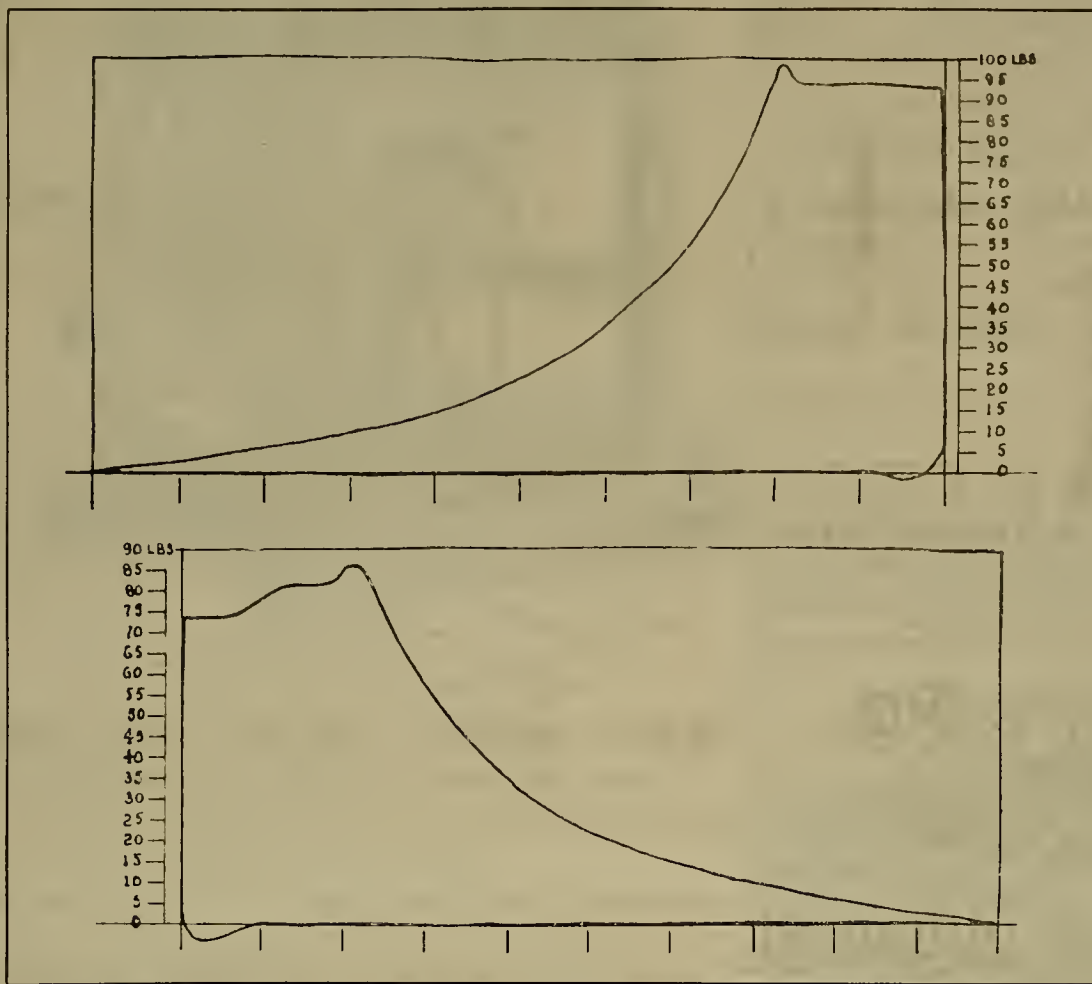
Over 20 years ago Mr. Knight, in common with others, made water wheels entirely out of wood. The buckets were shaped like saw teeth, and wooden flanges covered the sides of the buckets to confine the water. A round nozzle was used, and the general results were considered at the time very satisfactory. Then the wooden wheel was given iron buckets, a curve being given to the buckets so the water would be discharged toward the center. A few years later Mr. Knight made an improvement by using a curved iron bucket and having the discharge toward the center and to one side. After continued experiments with the round nozzle he found it did not fill the general requirements; he could not cover enough bucket space along the periphery of the wheel, without covering an equal space in the width of the bucket, by increasing the diameter of the round nozzle.

This induced him to try an elliptical or oblong nozzle, and the first wheel of this character was placed in the Lamphear mine, at Mokelumne Hill; it was quickly followed by two others, so satisfactorily did they work. From these wheels sprang the present Knight Water Wheel, for here it was he conceived the idea of abandoning entirely any direct modification of the round nozzle, and the opening was made in the form of a narrow rectangular slit. The round nozzle did well enough where small quantities of water were used, but upon using considerable water the nozzle became so large that while the upper edge could be brought near the wheel the lower edge was far away, and Mr. Knight was of the opinion that this reduced the power materially, so the slit was determined upon. More than one nozzle was also tried but it did not prove satisfactory.

In 1875 the first wheel of the present style was placed in the Lincoln mine, Sutter Creek, Amador county, and from that time various improvements have been made in the size and arrangement of the slits in the nozzle and shape of the buckets, until the wheel assumed the improved form shown in the engraving. For general utility and economy its features are recognized, and it is largely in use, especially among the mining regions.

The following paragraph from a recent number of *Industry* shows the advantage of this wheel as applied to an electrical plant: "We, last month, mentioned an open turbine wheel of 100 horse power, made by Messrs. Knight & Co. of Sutter Creek, Amador county, to operate under the low head of 27 feet, for an electrical plant at Yreka, Cal. This wheel has since then been started, and the superintendent, Mr. James Quinne, writes that its performance is a surprise, claiming that Mr. Knight himself does not appreciate the advantages of the system, and sets down the power developed at 20 per cent over the estimate for capacity. We are getting ready to make a prediction before long, respecting open or tangential turbines *versus* enclosed or pressure ones, and the part they will play in the near future. It may seem like going back to old ideas, and if so, it will not be the first time we have had to do so. Imagine one of the refined Jonval or Fourneyron wheels out of its casing, throwing that away, and set the wheel up in open view, stripped of more than half its details, and after all getting more work out of it."

It may be stated, with reference to the above, that Mr. Quinne received bids from the principal wheel makers in the United States, and Mr. Knight's guarantee was 6 horse power more than the highest of the others. This guarantee was 100 horse power with 2500 cubic feet of water per minute. According to Mr. Quinne's statement, the wheel ran to 125 horse power.



CARDS FROM THE NEW 16X20 DUPLEX AIR COMPRESSOR OF THE KEYSTONE MINING COMPANY.

six inches in diameter. The cards show over 70 horse power when the compressor is making 52 revolutions per minute. The indicator spring was 40 scale. The compressor is driven by a water wheel four feet in diameter, having two nozzles each 1 64-

cribbing, drifting and timbering in the bad ground encountered on the line of the Croton aqueduct. So bad was this ground at one place that after hard work under several plans the arch reached a point 18 feet short of where the heading had been

and Fig. 2 shows the successive drifts in bad ground, shaft 13, south heading. In the next number of the PRESS will be shown the steps taken for the successful advance of the drift by the English method.

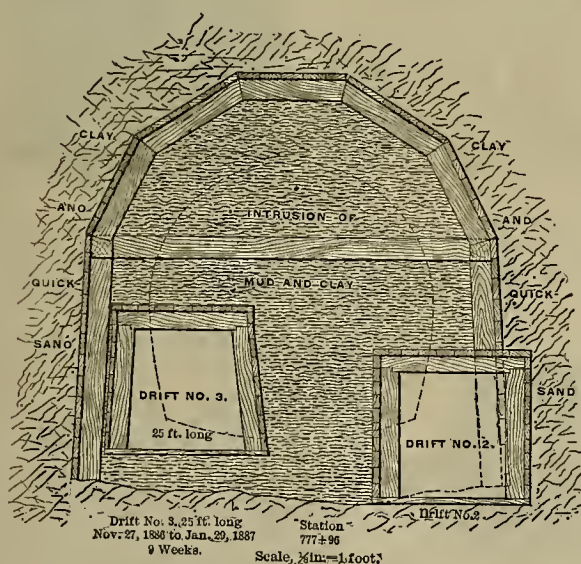


FIG. 1.—SECTION SHOWING DRIFT NO. 3.

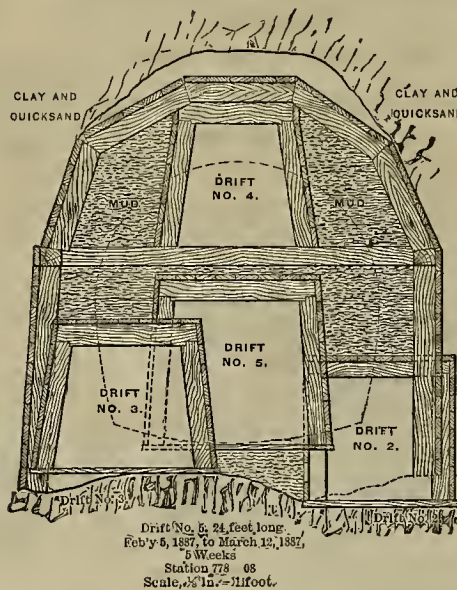


FIG. 2.—SUCCESSIVE DRIFTS IN BAD GROUND, SHAFT 13 SOUTH HEADING.

100 inches in diameter. The water pressure was 120 pounds per square inch, equal to a head of 277 feet. The amount of water used was less than 140 miner's inches, Amador Canal Co's. measurement which is 14-10 cubic feet per miner's inch. This air-compressor was built by W. T. Garratt & Co. of this city, for the Keystone Cons. Mining Co. of Amador county.

nearly a year before. During the next four months the following drifts were run: Drift No. 3, east side at grade, nine weeks, 27 feet to + 22; drift No. 4, top center, one week, 8 feet to + 13; drift No. 5, center of grade, 6 weeks, 24 feet to + 32. These drifts are shown in the accompanying engravings. The drifts were no more successful than the others; however, they were

THE museum of the California Academy of Sciences in this city is now open daily, and it has been resolved to keep it open on Sundays from 10 o'clock till 4 o'clock, commencing on the 7th inst.

PROF. CHARLES A. KEELER delivered a very able and exhaustive lecture Monday night at the Academy of Sciences on the

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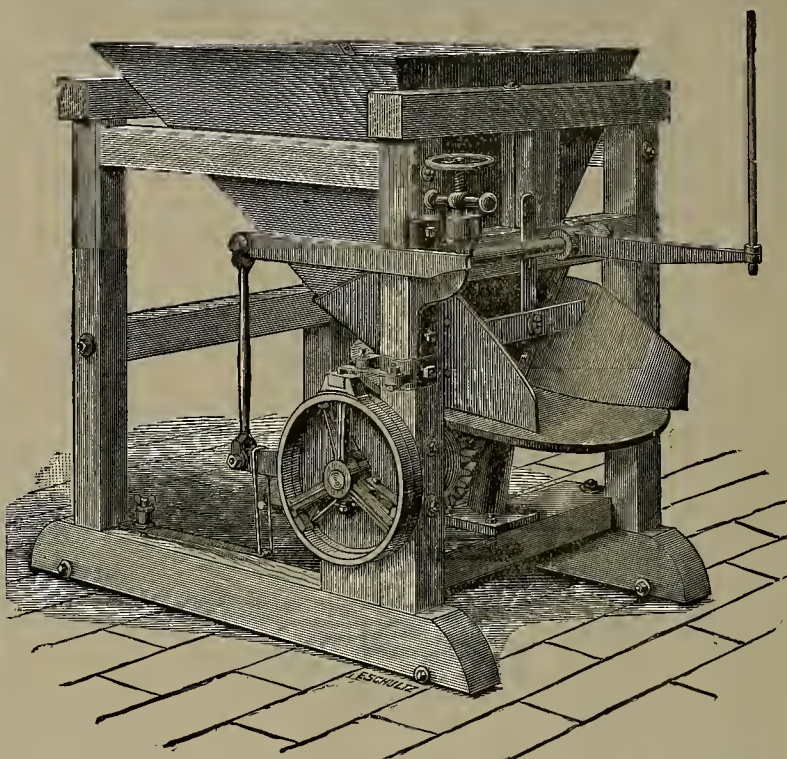
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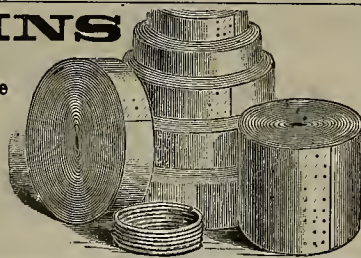
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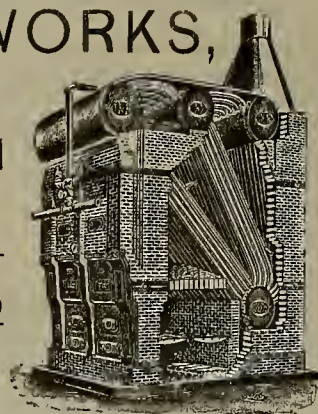
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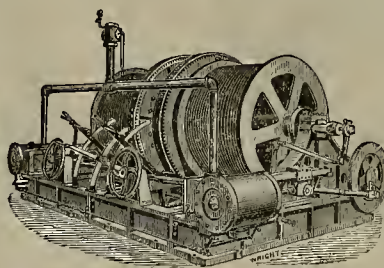
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The Two Conventions.

MIDDLE CREEK, Shasta Co., Feb. 2, '92.

TO THE EDITOR:—As a delegate to the National Mining Congress held in Denver, Colo., in November last, and also to the Miners' Convention held in San Francisco, January, 1892, I feel licensed to say something in regard to both.

The San Francisco Convention, unlike the Denver, was strictly a one idea meeting, and as such it fell short of what a California State Convention should be. The land question it did not touch in the spirit it should have done. Railroad claim to mineral lands was given the go by, and what more vital question to the mass of miners is there? The silver question also was ruled out, and is not this also a vital question to the mining interest—the miner?

California miners may not be so much interested in the silver question as those of Nevada, Utah or Colorado, but is that any reason why they should not seek to help along their fellow miner who extracts the white metal?

The Denver Convention put forth and passed every line of several resolutions in the interest of hydraulic mining, as prepared by the California delegation, and they have no hydraulic mining. The land question, as it affected every mining State, received also marked attention.

Take the Denver Convention as a whole, it exceeded in broad-minded work and independence of action that of California. They had no lash over their heads and dared to talk emphatically on railroad land grants, hydraulic mining or silver coinage.

Our convention, as a one-idea one, was a grand success—a pleasing one. The lion and the lamb laid down together—in fact, jumped into the same bed—and almost caressed each other, which would have been very touching had there not been some political futures in it.

For one I am free to say that I felt somewhat disappointed in the limited line of action of our California convention, considering so many mining men, from every section, had gathered together for the first time; and I am not alone in this. A State Miners' Convention should not be a one idea affair at all. Miners are not confined to one class or kind of mining. When men expend their time and money, it should be for something more than to vote yes for sustaining a single branch.

Another objectionable feature presents itself to my mind, and it is this: As a State Miners' Association why do we organize in it every valley county? As far as the late convention and hydraulic question went this was well enough and strictly proper, but there affiliation with the granger should have stopped. They don't admit the miner into their State councils. A State Miners' Association should be composed of the mining counties only, or I will say only of miners; and this I think will be the sentiment of every mining county association organized or to be organized. I don't want to be captious, but the fact is, that having been for over 40 years so much among the rocks, I have gotten a little of their solidity ground into my bones, and I want to see the miner assert his right and independence enough to stand square on his own feet. The tirades of the granger against the hydraulic interest have seriously injured every class of business, and even crippled themselves, and for one I don't propose to jump into bed with them and hug their short-sightedness so dearly.

Last year we produced \$10,000,000. The great mining State of California producing only \$10,000,000! This is a good figure for an individual bank account, but as a gold output for California nothing so clearly illustrates the damage done to the gold mining industry. Why, the little district about Johannesburg (South Africa) produced \$13,250,000 for 1891.

As the prospects now are that this war between the farmer and hydraulic miner is over, let us hope that the incoming of capital will increase and our gold output along with it.

For one I would like to see at some future day a State Miners' Convention for the discussion of subjects pertaining to gold and silver mining, the advancement of the several branches, as electrical applications, new explosives, new mechanical devices, new systems, and new ideas generally. In such a meeting every delegate might return to his home carrying new and valuable information received from others in an exchange of ideas.

In making these criticisms I do not want to be considered an enemy to hydraulic mining. On the contrary, for I am one of those ruined by the grangers fight against it, and no one in the State has written and published more in its behalf than your humble servant.

ALMARIN B. PAUL.

Bullion Product of 1891.

We are indebted to John J. Valentine, Vice-President and General Manager of Wells, Fargo & Co.'s Express, for the following copy of his annual report of precious metals produced on the Pacific Slope:

The following is our annual report of precious metals produced in the States and Territories west of the Missouri river (including British Columbia) during 1891, which shows in the aggregate: Gold, \$31,975,994; Silver, \$60,614,004; Copper, \$13,261,663; Lead, \$12,385,780. Total gross result, \$118,237,441. The "commercial" value at which the several metals named herein have been estimated is: Silver, 98 cents per oz; Copper, 11 cents per lb; and Lead, \$4.30 per cwt.

As in former reports, allowance must be made for probable variations from exact figures, by reason of constantly increasing facilities for transporting bullion, ores and base metals from the mines outside of the express, and the difficulty of getting entirely reliable data from private sources. Especially is such the case in the reports from Montana and Colorado; in fact, we have estimated the amount credited to Montana. Statistics gathered in this way are liable to be exaggerated; but with some modifications on this account made herein the final general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances. No bullion or coin received by Wells, Fargo & Co.'s Express from the west coast of Mexico during 1891.

STATES AND TERRITORIES.	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Ores and base bullion by freight.	Total
California.....	\$3,104,772	\$1,380,716	\$476,745	\$1,284,000	\$6,246,233
Nevada.....	2,670,575	50,000	1,079,015	\$12,216,238	\$16,965,828
Washington.....	181,000	30,000	112,000	1,088,000	\$1,391,000
Idaho.....	2,600,000	850,000	4,600,000	11,505,000	\$19,705,000
Utah.....	2,000,000	1,000,000	1,000,000	1,000,000	\$5,000,000
Montana.....	1,000,000	1,000,000	1,000,000	1,000,000	\$4,000,000
Colorado.....	1,000,000	1,000,000	1,000,000	1,000,000	\$4,000,000
New Mexico.....	1,000,000	1,000,000	1,000,000	1,000,000	\$4,000,000
Arizona.....	1,000,000	1,000,000	1,000,000	1,000,000	\$4,000,000
British Columbia.....	1,000,000	1,000,000	1,000,000	1,000,000	\$4,000,000
Total.....	\$27,760,960	\$2,490,716	\$8,809,188	\$29,166,677	\$118,237,441

The exports of silver during the past year to Japan, China, the Straits, etc., have been as follows: From London, \$33,467,075; from San Francisco, \$7,912,370; total, \$41,379,445, as against \$47,974,309 last year. Pounds Sterling estimated at \$4.84.

ANNUAL PRODUCTS OF LEAD, COPPER, SILVER AND GOLD IN THE STATES AND TERRITORIES WEST OF THE MISSOURI RIVER, 1875-1891.

YEAR.	Production as per W. F. & Co.'s statement, including amounts from British Columbia and west coast of Mexico.	Product after deducting amounts from British Columbia and west coast of Mexico.	LEAD.	COPPER.	SILVER.	GOLD.
1875.....	72,238,698	70,189,803	3,400,000	27,488,902	30,006,658	30,006,658
1876.....	80,880,007	78,831,102	3,800,000	27,009,132	30,006,658	30,006,658
1877.....	80,880,007	78,831,102	3,800,000	27,009,132	30,006,658	30,006,658
1878.....	98,491,734	96,442,839	5,000,000	33,290,000	44,880,228	44,880,228
1879.....	98,491,734	96,442,839	5,000,000	33,290,000	44,880,228	44,880,228
1880.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1881.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1882.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1883.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1884.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1885.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1886.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1887.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1888.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1889.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1890.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228
1891.....	104,154,622	102,105,727	5,000,000	33,290,000	44,880,228	44,880,228

The gross yield for 1891, shown above, segregated, is approximately as follows.

Gold.....	27.04	\$31,975,994
Silver.....	61.26	\$60,614,004
Copper.....	11.92	\$13,261,663
Lead.....	10.48	\$12,385,780
Total.....		\$118,237,441

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JAN. 26, 1892.

- 467,681.—MAIL BAG—C. Dickenson, Portland, Or.
 467,882.—CAR COUPLING—F. A. Fox, S. F.
 467,607.—ROTARY EXCAVATOR—W. P. Humphreys, S. F.
 467,685.—EXTENSION LADDER—E. W. Hammon, Medford, Or.
 467,687.—FRUIT GATHERER—D. B. Matlock, San Jose, Cal.
 467,620.—DISH WASHER—W. C. Nelson, Santa Rosa, Cal.
 467,612.—HYDRAULIC MOTOR—E. I. Nichols, S. F.
 467,772.—DUMP CAR—C. D. Page, Tacoma, Wash.
 467,614.—CAR COUPLING—David Stark, S. F.
 467,696.—FLASH-LIGHT BURNER—S. M. Williams, S. F.

The following brief list by telegraph, for Feb. 2d, will set more complete on receipt of mail advices: Mark Anthony, Berkeley, and W. C. Savage, Oakland, Cal., thimble and bushing for barrels, G. W. Bedbury and E. F. Badgley, San Francisco, pile armor and casing; Edgar M. Bredwell, McMinnville, Oregon, anti-friction axle-box; Henry Bryan, Modesto, Cal., grato-cleaner attachment; Columbus F. Cardwell, Bridal Veil Oregon, door securer; James A. Christy, San Francisco, Cal., telephone holder; Gilbert T. Franklin, Walla Walla, Wash., gravel-screening machine; Alexis Janin, San Francisco, Cal., amalgamating silver ores; Charles J. Koefoed, San Francisco, band-saw mill; William F. Loan, Portland, Oregon, holders for brushes and dusters; Henry C. Lynch, Sao Francisco, Cal., cable-grip adjusting device; David R. McKim, Gold Hill, Nev., valve; Dennis O. Sullivan, Spokane Falls, Wash., sling cinch; Robert W. Parker, Camp Huachuca, Ariz., rite sight; Emilio Brunetti and G. Avigdon, Sierra City, Cal., aerial tramway; Fairfax H. Wheelan, Santa Barbara, Cal., separator; Henry G. Gates, San Francisco, ball-bearing device.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail or telegraph order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and to the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

FRUIT GATHERER.—David B. Matlock, San Jose, No. 467,687. Dated Jan. 26, 1892. This improved device for gathering fruit consists of a case or receptacle supported above the end of a pole or standard, and having a flexible self-adjusting bottom to receive the fruit, and a device consisting of a semicircular shears mounted above the top of the receptacle in such a manner that the stems of any fruit would be sheared off between the cutting blades at any point around the circumference, with a means for supporting said blades.

EXTENSION AND STEPLADDER.—E. M. Hammon, Medford, Oregon, No. 467,685. Dated Jan. 26, 1892. This consists in the combination of parts forming a stepladder and supports therefor, and a means whereby the ladder may be converted into an extension ladder with suitable strengthening and locking devices.

AUTOMATIC CUT-OFF FOR GAS BURNERS.—James E. Hogaz, Oakland, No. 467,287. Dated Jan. 19, 1892. This electric safety attachment for gas burners is intended to provide a supplemental means for cutting off the flow of gas in case the usual key is accidentally turned or left open after the light has been extinguished.

PNEUMATIC CLUTCH.—Byron Jennings, San Jose, assignor of one-half to James Brusie, Oakland, No. 467,288. Dated Jan. 19, 1892. This improved clutch is specially designed to be used upon rotary machinery, in which one portion is to be kept constantly running, while the other portion is subject to stops, without arresting the motion of the other portion. It consists of a pneumatically expandable tube or collar fitting between the adjacent faces of the two portions of the machinery so that when in its normal condition and unexpanded, it allows one portion to turn without communicating motion to the other; but when expanded, it produces such frictional contact between these adjacent faces that motion is communicated from the constantly moving part to the other. The weight of an operative electrical motor is very considerable, and when employed to propel cars or other machinery where frequent stops are to be made, the power lost in constantly stopping and starting the motor is very considerable. For this reason, it is desirable to allow the motor when once started to run continuously and to provide an intermediate means for stopping the machinery without stopping the motor.

HOISTING APPARATUS.—Joseph Mount and Frank H. Warnock, Spokane, Washington, No. 467,289. Dated Jan. 19, 1892. The invention relates to that class of hoisting or elevating mechanism in which endless traveling ropes, chains or cables are employed, and which carry the receptacles containing the material to be hoisted. The object of the invention is to provide a simple means for hoisting material of any kind, but more particularly for elevating brick and mortar from the ground to any of the floors of a building in process of construction.

Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY. Location of principal place of business, San Francisco, California; location of works, Virginia, Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 5th day of January, 1892, an assessment (No. 68) of Thirty (30) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, room 69 Nevada Block, 303 Montgomery Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 5th day of February, 1892, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the first (1st) day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DURBROW, Secretary. Office—Room 69 Nevada Block, 303 Montgomery Street, San Francisco, Cal.

SAN FRANCISCO MILLING AND MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, West Point, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of January, 1892, an assessment (No. 1) of Two (2) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 15th day of February, 1892, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 5th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

CHAS. H. OSBORN, Secretary. Office, Room 11, No. 303 California Street, San Francisco, California.

GRAY EAGLE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of January, 1892, an assessment (No. 27) of Six (6) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of February, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 7th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

A. W. BARROWE, Secretary. Office, Room 11, No. 303 California Street, San Francisco, California.

CALIFORNIA VERDE ANTIQUE MARBLE COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of January, 1892, an assessment (No. 2) of One (1) Cent per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, 303 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the seventh (7th) day of March, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 15th day of March, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale. By order of the Board of Directors.

W. J. GURNETT, Secretary. Office, 303 Pine Street, San Francisco, California.

KEYSTONE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Amador City, Amador Co., Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on Saturday, the 30th day of January, 1892, an assessment (No. 2) of Two Dollars and Fifty Cents (\$2.50) per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, No. 310 Pine St., room 43, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of March, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 5th day of March, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Directors.

H. H. ISHAM, Secretary. Office, No. 310 Pine St., Room 43, San Francisco, Cal.

Advertisement for Proposals!

TUNNEL.

SEALED PROPOSALS WILL BE RECEIVED BY THE Directors of the Bear Valley Irrigation Company at Redlands, California, until March 1st, 1892, for the construction of a Tunnel about 600 feet in length through rock, in accordance with the plans and specifications on file in the office of the undersigned. Bidders may propose to furnish their own plant, or to use a complete power-drilling, hauling and ventilating plant to be furnished by the Company. Each bid must be accompanied by a certified check for not less than 2% of the amount of the proposal. The Directors reserve the right to reject any or all proposals. EDWARD M. BOGOS, Engineer, Banning, California.

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DIVIDEND NOTICE.

OFFICE OF THE PACIFIC COAST BORAX COMPANY, San Francisco, January 30, 1892. At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 14) of One Dollar (\$1.00) per share was declared, payable WEDNESDAY, February 10, 1892, at the office of the Company, No. 230 Montgomery St., Rooms 11 and 12. Transfer books will close February 5, 1892, at 3 o'clock, P. M.

ALTON H. CLOUGH, Secretary.

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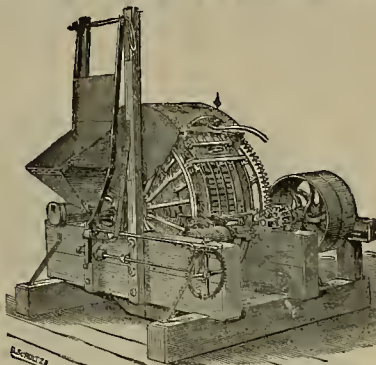
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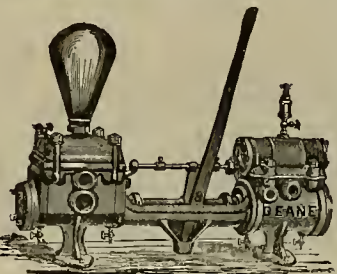
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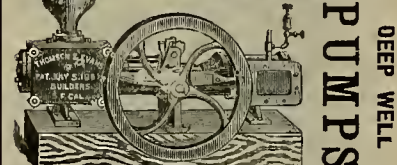
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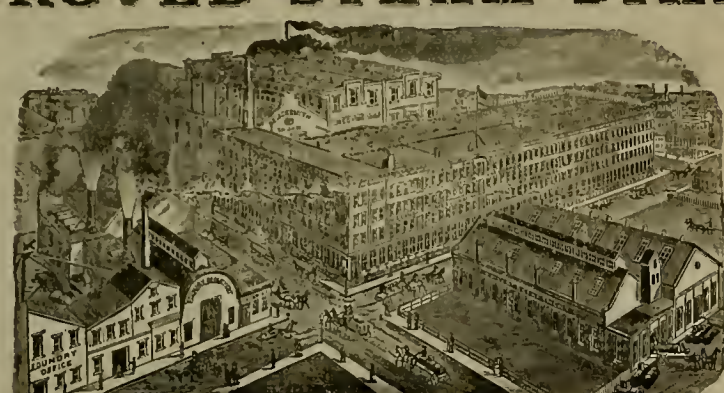
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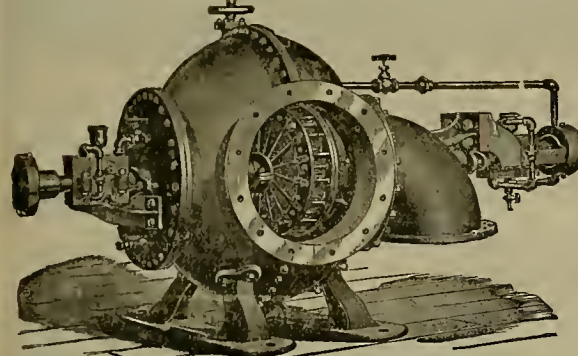
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JAMES LEFFEL & CO., Springfield, Ohio, or 110 Liberty St., New York. FRASER & CHALMERS, General Agents, Chicago, Ill., and Denver, Col. PARKE & LAOY CO., General Agents, San Francisco, Cal.

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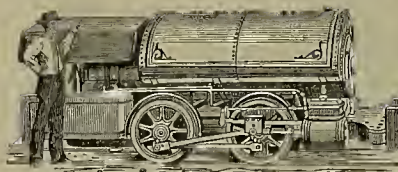
ANNUAL CAPACITY 1000. ESTABLISHED 1831.

LOCOMOTIVE ENGINES!

Adapted to every variety of service, and built accurately to standard gauge and templates. Like parts of different engines of same class perfectly interchangeable. Broad and Narrow Gauge Locomotives, Mine Locomotives by Steam or Compressed Air, Plantation Locomotives, Noiseless Motors for Street Railways, Furnace Locomotives, etc.

COMPOUND LOCOMOTIVES


BURNHAM, WILLIAMS & CO., Proprietors, Philadelphia, Pa.



CLAYTON AIR COMPRESSORS

For Working Rock Drills, Coal Cutters, Hoisting Engines and Water Pumps in Mines and Tunnels, Sinking Caissons, Etc., Etc. SEND FOR CATALOGUE No. 6. Clayton Air Compressor Works, 43 DEY ST., NEW YORK.


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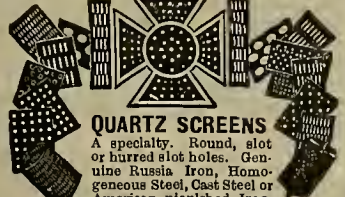
VICTOR ELECTRIC PLATINUM FUSES. Superior to all others for exploding any make of dynamite or blasting powder. Each fuse folded separately and packed in neat paper boxes of 50 each. All tested and warranted. Single and double strength, with any length of wires. VICTOR BLASTING MACHINE. Made in two sizes. No. 2 fires 20 to 30 holes. No. 1 fires 5 to 8 holes. Adapted for prospecting, stump blasting, quarry and general railroad work. "PULL UP" BLASTING MACHINE. The strongest and most powerful machine ever made for Electric Blasting. No. 4 size fires 70 holes. No. 3 size fires 40 holes. Are especially adapted for submarine blasting and large mining work. Standard Electric Fuse and Blast Tester, Wire Reels, new design, Leading and Connecting Wire. MANUFACTURED ONLY BY JAMES MACBETH & COMPANY, 128 Maiden Lane, New York City. PARKE & LAOY CO., San Francisco, Cal., AGENTS.

GREAT REDUCTION!

BATTERY SCREENS. Best and Cheapest in America.



PERFORATED SHEET METAL For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Min- ing and Milling Machinery. Iron, Steel, Copper, Brass, Zinc and other metals punched for all uses. Inventor and Manufacturer of the celebrated Slot Cut or hurred and Slot Punched Screens. Mining Screens a specialty, from No. 1 to 15 (fine). Orders promptly attended to. San Francisco Pioneer Screen Works, 221 & 223 First St., San Francisco, Cal. JOHN W. QUICK, Proprietor.



QUARTZ SCREENS

A specialty. Round, slot or hurred slot holes. Genuine Russia Iron, Homo- geneous Steel, Cast Steel or American planished Iron. Zinc, Copper or Brass Screens for all purposes. Call- ornia Perforating Screen Co., 145 & 147 Beale St., S. F.

THOMAS PRICE & SON, Assay Office, Chemical Laboratory, BULLION ROOMS and ORE FLOORS, 524 Sacramento Street, San Francisco, Cal. COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS. WORKING TESTS OF ORES BY ALL PROCESSES. SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES. Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

AMERICAN EXCHANGE HOTEL, SAN FRANCISCO, CALIFORNIA.

ROOMS and BOARD by the DAY, \$1 to \$1.50; by the Week, \$6 to \$10; by the Month, \$25 to \$40. Good Rooms and Elegant Table. Meals, 25c. Single Rooms, 50c. Free 'Bus.

JAMES M. HAVEN. THOMAS E. HAVEN, Notary Public. HAVEN & HAVEN, ATTORNEYS AND COUNSELORS at LAW. No. 530 California Street, Telephone No. 1746. SAN FRANCISCO, CAL. Engraving. Superior Wood and Metal Engraving, Electrotyping and Stereotyping promptly attended to at this office

Astronomical Society of the Pacific.

The meeting was held on January 30th, by invitation, in the lecture hall of the California Academy of Sciences, 819 Market St., San Francisco. President Pierson presided.

A list of thirty-seven members was read who had been elected at the directors' meeting. Among the presents received was a finely colored lithograph of the partially eclipsed moon, drawn by Prof. Weinek of Prague, and the secretary announced that Prof. Weinek had presented 1000 copies to the society for binding in the publications.

The following papers were presented: The Rotation of the Sun (translation from the German of Dr. Schmidt), by A. C. Behr of Chicago; Pogson's Comet and the Bielau Meteors, by W. H. S. Monk of Dublin, Ireland; The McKim Observatory, by Prof. W. V. Brown of Greencastle, Indiana; When Shall we have Another Glacial Epoch?, by Garrett P. Serviss of New York City; The Total Eclipse of the Moon, January 28, 1888, by Prof. Weinek of Prague (translated by F. R. Ziel of San Francisco).

Committees to nominate a Board of Directors and Committee on Publication, and to audit the Treasurer's accounts, were appointed, to report at the Annual Meeting, to be held March 26th.

The President announced that a branch of the Society was being organized in Pittsburgh, similar to the Chicago branch.

The room was then darkened and 75 lantern slides thrown on the screen, by Prof. W. W. Campbell, illustrating the methods employed and the results obtained in stellar photography and spectroscopy at the Lick and other observatories. The exhibit of 75 lantern slides included copies of the recent photographs of the moon, Jupiter, the Nebula of Orion, and the clusters of Perseus and Hercules, made by Profs. Holden and Campbell with the 36-inch telescope; diagrams illustrating the recent investigations of Prof. Schaeberle on the photographic atmospheric absorption; the Milky Way pictures made by Prof. Barnard; pictures of the nebulae and clusters, by Mr. Isaac Roberts; and views of the recent Mt. Hamilton forest fires by Mr. Campbell.

The second part of the lecture was devoted to a detailed explanation of the methods of spectrum analysis, illustrated by diagrams, by photographs of the principal spectroscopes, and by photographs of star spectra made at Harvard College Observatory and at Potsdam. Present spectroscopic results were reviewed, and the nature of the pending spectroscopic problems explained.

The Late Humphrey Rees.

Humphrey Rees, one of the oldest and most skillful miners on the "Mother Lode," died last week at Sutter Creek, Amador county. He was a native of North Wales, aged 70 years. Mr. Rees had been a subscriber of the MINING AND SCIENTIFIC PRESS for a great many years, and was a pioneer citizen of Sutter Creek. A correspondent of the Amador Ledger speaks of him as follows: "Humphrey Rees died at 3 o'clock Sunday afternoon, after an illness of several weeks, of the grippe, aggravated by chronic asthmatic trouble. He has been identified with the mining interests of the county since early days, and was widely known throughout Amador, his many friends testifying their appreciation of his character by deeply felt regret at his removal, and universal expressions of esteem for his honesty and integrity in all the walks of life. The funeral took place Monday, and was one of the largest attended that has been witnessed here for some time, a great many from the outside towns being present. Deceased was a member of the Odd Fellows' fraternity, and the last rites were performed in accordance with the ritual of that Order, the body finding its final resting place in the Odd Fellows' cemetery. Deceased leaves two married daughters, Mrs. Jones and Mrs. Prosser. His wife preceded him to the grave three months ago."

SOME thousands of dollars have been already collected from companies and individuals in San Francisco to help the miners' cause, and an active Finance Committee is still at work.

THE Miners' Committee to Congress consists of Niles Searles, J. K. Luttrell, Robt. McMurray and J. B. Hobson. They leave next Monday for Washington.

A STRONG COMPANY has been formed in Los Angeles to develop oil wells. It is called the Rowland & Lacy Petroleum and Land Co.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, FEBRUARY 4, 1892.

General rains the past week have created a more cheerful feeling and inspires trade in general with the belief that this year California's crops will be the largest that have been harvested at any time within her history. Not only will the crops be large but the mining season promises to be extended into the summer months, owing to heavy snow deposits on the mountain ranges.

The local money market continues to rule easy, with the rate of interest in borrower's favor. This is largely due to the heavy dividends disbursed in last month. These dividends compare as follows with the same month last year:

	1891.	1892.
Banks.....	\$577,500	\$602,500
Gas Companies.....	76,750	76,000
Water Companies.....	71,500	74,500
Insurance Companies.....	77,250	46,000
Street Railroad Companies.....	10,000	18,000
Power Companies.....	28,250	27,000
Sugar Companies.....	99,000	
Mining Companies.....	295,569	233,600
Miscellaneous Companies.....	14,730	17,500

Totals.....\$1,181,189 \$1,094,900

In addition the 10 saving banks of the city disbursed their semiannual dividends on their capital stock and deposits, amounting to over \$2,000,000.

The aggregate resources of all banks in California on January 1, 1892, under the jurisdiction of the State Board of Bank Commissioners were as follows:

Commercial.....	\$126,865,294
Private.....	3,824,196
Savings.....	133,310,349
Total.....	\$263,999,839
January 1, 1891.....	246,031,488

Increase.....\$17,968,351

MEXICAN DOLLARS.—The market is slow at 7 1/2 @ 7 3/4.

QUICKSILVER.—Receipts the past week aggregate 301 flasks. The market is lower for both home and export. We are indebted to J. B. Randol for the following statement of quicksilver produced in California during the given years, flasks containing 76 2/3 lbs net:

Mines—	1889.	1890.	1891.
New Almaden.....	13,100	12,000	8,300
Napa Con.....	4,500	2,483	4,080
Bradford.....	1,874	1,250	1,824
Sulphur Bank.....	1,283	1,608	1,375
Great Eastern.....	1,345	1,046	1,759
New Idria.....	980	977	870
Atma.....	931	931	1,049
Great Western.....	556	1,384	2,066
Redington.....	812	505	442
Various.....	924	737	1,221
Totals.....	26,464	22,926	22,886

During 1891 the lowest market price was \$39.50 per flask, and the highest was \$51, or say an average of \$45.25 for the year.

SILVER.—Still lower prices were touched the past week, but toward the close a steadier feeling manifested itself. The Mint purchase not only takes the entire production of this country, but is steadily absorbing the surplus. The market going down in the face of the above, is accepted as confirmatory of the general belief of its being under strong manipulations so as to secure some large holdings abroad at low prices. We judge from the investigation now under way by the House Committee on Coinage, Weights and Measures, that the sentiment in Europe is settling strongly in favor of bimetalism; even in such strong monometal countries as Great Britain and Germany opinion is changing.

BORAX.—The market is steady at current quotations. Exports to New York by sea the past week aggregate 10,040 cts.

LEAD.—The local market is steady at unchanged quotations. The East reports a fairly steady market, notwithstanding buyers are using "foreign importation" to keep prices down. There was shipped to New York the past week 2125 cts.

COPPER.—No further changes were reported the past week. The exports by sea aggregate as follows: 20 tons dross to Liverpool and 222 tons to New York. New York mail advices, while not of an encouraging character, yet they hold out inducements for expecting better prices later on. London cables to Iron Age, Jan. 23, are as follows: "Notwithstanding good forward buying for French account and more or less covering of short accounts by the 'bear' interest, prices for copper have receded under the weight of steady pressure realized by numerous holders who were more or less alarmed over reports of expected increase in supplies from America."

TIN.—The market begins to show signs of looking for more business in the near future, but until this sets in, quotations are more or less nominal. London cables report that for plate, American inquiries are numerous, particularly for light weights and specialties, but owing to low limits of prices, only a fair business has resulted. Makers are firm. The Trefoil Co. has restarted seven and the Gwendraeth Co. five mills.

IRON.—The market continues to rule fairly strong. Higher charters abroad are in favor of holders. Iron Age says that an Eastern and a Pittsburgh mill have closed, each for about 2000 tons of ship plates for the Pacific Coast at close figures.

COAL.—Imports the past week aggregate as follows: Newcastle, N. S. W., 9181 tons; Departure Bay, 3655; Seattle, 3828, and Nanaimo, 2940. Total, 18,944 tons. The market for spot and near by cargoes continues very weak and in buyers' favor. For shipment, there are no buyers at ships asking freight rates. Buyers in view of large crop prospects for wheat in this State, do not care to take cargoes for shipment at asking prices, believing that later on ships will lower their charter rates to this cost.

Mining Share Market.

The market has held to lower prices; yet while there has been no active demand and the market has been made to look "sick," there have been evidences of steady buying by strong parties—the stock pool, mill right or outside combinations. Continued levying of assessments and no disposition being shown (outside of the Overman Mining Co.) to conform to the law requiring car sample assays of all ores milled, are creating stronger disgust with outside operators. From a careful canvass among merchants and moneyed men who have dealt in stocks, the writer is convinced that it will take something more than "star articles" to induce them to draw in outsiders, and this being the case, who can the stock pool unload on, even if they manipulate the market to higher prices? It now looks as if the only redemption for the market, is success to crown the brokers' combination to make the mining companies conform to the laws of California under which they are incorporated. General interest continues to center in the suit of M. W. Fox against the directors of the Hale and Norcross Mining Co. and as each day's trial of the case unfolds the peculiar methods adopted to have the funds or bullion of the company misappropriated,

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	NO. AMT.	LEVIED, DELINQ'T AND SALE.	SECRETARY.
Alkali Coos M Co, California.....	2.....	Jan 16, Feb 20, Mar 9.....	E B Keeler, Pbelan Block
Alta S M Co, Nevada.....	41.....	Jan 5, Feb 9, Feb 23.....	L Osborn, 309 Montgomery
Butte Queen M Co, California.....	2.....	Jan 26, Feb 27, Mar 2.....	V Gadesden, 119 Bush
Cal Verde Antique Marble Co, California.....	1c.....	Feb 2, Mar 7, Mar 28.....	W J Gurnett, 303 Pine
Challenge Con M Co, Nevada.....	10.....	Jan 14, Feb 17, March 9.....	O L McCoy, 331 Pine
Chollar M Co, Nevada.....	32.....	Jan 8, Feb 11, March 3.....	C E Elliott, 309 Montgomery
Oro Imperial M Co, Nevada.....	33.....	Jan 22, Feb 25, Mar 15.....	O L McCoy, 331 Pine
Con St Gorbard M Co, California.....	4.....	Dec 22, Feb 2, Feb 23.....	S J Measer, 320 Sansome
Grand Con M Co, Nevada.....	11.....	Jan 10, Feb 13, Feb 27.....	J J Scoville, 320 Sansome
Evening Star M Co, California.....	3.....	Jan 20, Feb 22, Mar 12.....	J J Scoville, 320 Sansome
Excelsior M Co, Nevada.....	32.....	Jan 22, Feb 25, Mar 17.....	O E Elliott, 309 Montgomery
Foundry and Machine Co, Nevada.....	7.....	Jan 19, Feb 24, March 17.....	J W Few, 310 Pine
Golden Fleece Gravel M Co, California.....	16.....	Jan 30, Mar 24, Mar 28.....	W J Gleason, Pbelan Block
Gould & Curry S M Co, California.....	68.....	Jan 4, Feb 8, March 1.....	A K Durbrow, 309 Montgomery
Gold Mountain M Co, California.....	1.....	Jan 4, Feb 8, Feb 27.....	D C Curtis, 215 Grant Ave
Gray Eagle M Co, California.....	1.....	Jan 11, Feb 15, March 7.....	A W Barrows, 303 California
Hale & Norcross S M Co, Nevada.....	100.....	Dec 21, Jan 25, Feb 17.....	A B Thompson, 309 Montgomery
Imperial M Co, Nevada.....	33.....	Jan 23, Feb 25, Mar 15.....	O L McCoy, 331 Pine
Justice M Co, Nevada.....	49.....	Dec 23, Jan 23, Feb 17.....	E E Kelly, 414 California
Keystone Con M Co, California.....	2.....	Jan 30, Mar 7, Mar 28.....	J H Ham, 310 Pine
Martin White M Co, Nevada.....	27.....	Jan 8, Feb 11, March 12.....	K L Rose, 120 Sutter
Mexican G & S M Co, Nevada.....	44.....	Jan 14, Feb 17, March 10.....	O E Elliott, 309 Montgomery
Middle Creek G Co, British Columbia.....	27.....	Jan 16, Feb 20, Mar 22.....	H D Hawks, 315 Pine
Northwestern G & S M Co, British Columbia.....	4.....	Jan 15, Feb 24, Mar 16.....	F Bonaccia, 438 California
Occidental Con M Co, Nevada.....	9.....	Jan 5, Feb 16, March 10.....	A K Durbrow, 309 Montgomery
Savage M Co, Nevada.....	78.....	Feb 2, Mar 5, Mar 28.....	E B Holmes, 309 Montgomery
Sierra Nevada M Co, Nevada.....	101.....	Dec 15, Jan 25, Feb 15.....	Chas H Osborn, 309 Montgomery
Sierrita Nevada M Co, Nevada.....	101.....	Dec 15, Jan 25, Feb 15.....	Geo R Spinner, 303 Pine
Siskiyou Con Quicksilver M Co, California.....	2.....	Dec 2, Jan 23, Feb 19.....	E F Stone, 306 Pine
Starkton M & M Co, California.....	7.....	Jan 10, Jan 23, Feb 23.....	J J Gurnett, 303 Pine
Union Con S M Co, Nevada.....	45.....	Jan 6, Feb 11, March 2.....	A W Barrows, 303 California
Yellow Jacket M Co, Nevada.....	100.....	Feb 2, Mar 4, Apr 2.....	W H Blauvelt, Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	MEETING.	SECRETARY.	DATE.
Carara Marble Quarry, California.....	Annual.....	C Dondero, 506 Battery	Feb 8
Holmes M Co, Nevada.....	Annual.....	O E Elliott, 309 Montgomery	Feb 9
Lucky Hill Con M Co, Nevada.....	Annual.....	F D Black, 101 Sutter	Feb 11
Nadavita Water & M Co, California.....	Annual.....	D H Ward, 508 California	Feb 15
Watt Blue Gravel M Co, California.....	Annual.....	G A Berton, 323 Montgomery	Feb 15

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Ophamion M Co.....	10.....	T Wetzel, 320 Sansome	Aug 15
Oons Cal & Virginia M Co, Nevada.....	50.....	A W Havens, 309 Montgomery	Aug 17
Copple M Co.....	30.....	E M Hall, 313 Montgomery	Sept 10
Greene Con M Co, Nevada.....	25.....	A W Havens, 309 Montgomery	Sept 10
Great Western Quicksilver M Co.....	2.....	A Halsey, 328 Montgomery	Oct 1
Idaho M Co, Grass Valley.....	3.....	Grass Valley	Aug 4
Mayflower Gravel M Co, California.....	50.....	D M Kent, 330 Pine	Aug 20
Pacific Coast Borax Co, California.....	100.....	A H Clough, 230 Montgomery	Feb 10
Standard Coos M Co, California.....	10.....	J W Few, 310 Pine	Dec 22

the stronger grows the conviction that nothing short of visiting on the perpetrators the full penalties of the law, will create a reformation in mine management in the interest of all stockholders.

W. S. Hobart testified on Tuesday, Feb. 2nd, that he gave H. M. Levy one-eighth of the profits derived from the crushing of Hale and Norcross ore. As Mr. Levy got \$19.00 in one month as his share on 4800 tons it simply shows to stockholders that the mill's charge of \$7 per ton, allow them to divide in profit about half, or nearly \$3.50 per ton.

\$4000 shipment of bullion is on the way from the Peer Mining Co. The news from the Quipotoa district is that the mill is still running on Peer ore. They have started a drift in this mine 500 feet down to tap the ore found above so as to handle it more economically. From the Tuscaroras our advices are that the work on the sampling mill is being vigorously pushed. The results of the various assays made in the district is more encouraging. From the Bodie district official letters continue to report a falling off in the assay value of the ore milled by the Standard. In Mono the work is of a favorable exploring character. In Bodie, they are taking out ore from two narrow streaks on two different levels. The Bodie Miner of Jan. 29th says that the Bulwer Con mine has shown great improvement during the past month. A large body of high-grade ore has been developed and is being extracted, and the Bodie mill is kept supplied to its full capacity. The ore in the stope is all the way from 2 feet to 10 feet in width. The mill is turning out bullion of fine quality and very liberally in quantity, all of which goes to show that the Bodie mine is a most promising one. The Silver King Mining Co. reports ore extracting and sacking, which indicates that the mill will start up before the summer months pass by.

From the Comstock mines our advices are that Belcher is still taking out ore. It is held for milling. This company has made connection with Justice that admits of their taking the \$40 to \$50 ore in both New York and Great Britain. The secret work being done in the Gold Hill mines is quite important, and unless the rich ore that is being developed to the west is to be confiscated, one or more of the mines ought to pay dividends this year. Official letters from the Middle mines report an improvement on the sutro tunnel level. In Con. Virginia they are taking out some high-grade ore from a narrow streak on the 1500 level, which is being milled for milling with low-grade ores. The different levels extending downward in this mine are being opened up for better working when the management thinks it best to extract the rich ore found to the west. The joint Sierra Nevada—Union work on the 900-foot level in Union—shows an improvement, and unless work is stopped an important find is looked for. The pumping out of the Gold Hill mine is being pushed more advantageously. It is claimed that important work is being done in one or more of the mines on the drained levels.

San Francisco Metal and Coal Market.

ANTIMONY.		THURSDAY, February 4, 1892.	
Per lb.....	@ 15 1/2	English tool.....	16 @ 20
Refined, in car lots 8 @.....		"Sik" Diam'd tool.....	9 @ 9
Powdered, do.....	8 @	"Pick & Hammer.....	8 @ 10
Concentrated, do.....	14 @	Machine.....	4 @ 5
All grades jobbing at advance.....		Toe Chalk.....	4 @ 5
COPPER.		TIN PLATE.	
Bolt.....	22 @	B. V. steel grade.....	
Sheeting.....	22 @	"1420, spot.....	6 00 @ 6 50
Ingot, jobbing.....	22 @	"Barocal, 1420.....	6 00 @ 6 50
Do roofing, 1420.....	22 @	Do roofing, 1420.....	6 00 @ 6 50
Fire Box Sheets.....	22 @	Do, do, 2028.....	12 00 @ 13 00
IRON.		PIG TON.	
Bar, base.....	3 @	Spot @ lb, irreg.....	21 @ 21 1/2
Norway, base.....	4 @	ular none.....	21 @ 21 1/2
PIO IRON.		COAL.	
Eglinton @ ton.....	26 00	SPOT FROM YARD—PER TON.....	
Glenbrook.....	26 00	Wellington.....	\$3 50
Ans. 50 @ 30.....	26 00	Greta.....	8 00
Oregon Pig.....	30 00	Ans. 50 @ 30.....	7 50
Puget Sound.....	30 00	Gilman.....	6 50
Clay Lane White.....	25 00	Seattle.....	7 00
Shasta, N. L.....	25 00	Coos Bay.....	7 00
Langdon.....	26 00	Shasta, N. L.....	7 00
Tboruliffe.....	26 50	Egg hard.....	14 00
Gartaberrie.....	26 50	Oumberland, in sacks.....	10 00
Barrow.....	26 00	Do, bulk.....	9 00
Scotch Splint.....	26 00	Alstead.....	7 50
CHROME IRON ORE.		Scotch Splint.....	
Pertont.....	10 00 @	Bryno.....	8 00
HEAD.....		West Hartley.....	8 50
Pig.....	4 @	To load—PER TON.....	
Sheet.....	5 @	Anstalt.....	\$7 50 @
Pipe.....	6 @	Liverpool St.....	7 50 @
Discout 107 @ 500 bags.....		Scotch Splint.....	7 50 @
Drop, @ bag.....	1 30 @	Ordif.....	7 25 @
Bulk, @ bag.....	2 10 @	Lehigh Lump.....	13 00 @
Chilled, do.....	2 30 @	Do, do.....	13 00 @
CUT LUMBER.		Do, do.....	
Home trade, per.....	43 00 @	Egg, bard.....	12 00 @ 13 00
flask.....	@ 39 00	West Hartley.....	8 50 @ 9 00
For export.....	@ 39 00	English, to bulk.....	\$9 00 @ 11 00
		Do, spot, in bulk.....	11 00 @
		Do, in sacks.....	13 00 @

Eastern Metal Markets.

New York, Feb. 4.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	42	91 1/2	10 62 1/2	4 25	19 20
Friday.....	42	91 1/2	10 62 1/2	4 25	19 70
Saturday.....	41 13-16	91 1/2	10 70	4 20	19 70
Monday.....	41 13-16	90 1/2	10 70	4 20	19 60
Tuesday.....	41 9-16	90 1/2	10 70	4 20	19 60
Wednesday.....	41 9-16	90 1/2	10 70	4 20	19 60

The metal market continues to partake more or less of an offish character, due to buyers confining their purchases. Quicksilver is barely steady at the recent decline. Borax is moving off fairly free.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 14.	WEEK ENDING Jan. 21.	WEEK ENDING Jan. 28.	WEEK ENDING Feb. 4.
Albion.....	.45	.55	.45	.55
Alta.....	.50	.65	.50	.60
Andes.....	.55	.60	.55	.75
Belcher.....	1.60	2.50	1.90	2.40
Belle Isle.....	.30	.25	.30	.30
Best & Belcher.....	2.00	2.25	2.15	3.50
Bullion.....	1.25	1.40	1.15	1.50
Bodie Con.....	.60	.65	.55	.65
Bulwer.....	.50	.70	.45	.50
Commonwealth.....	.20	.25	.20	.25
Oons Va. & Cal.....	3.50	4.00	3.70	4.50
Obalogue.....	.75	.80	.65	1.00
Confidence.....	2.75	3.00	2.75	3.25
Oro Imperial.....	.05	.10	.05	.10
Oretonia.....	.30	.35	.30	.40
Crow Point.....	1.20	1.60	1.25	1.65
Crocker.....	.60	.65	.55	.60
De Mont.....	.50	.45	.50	.60
Eureka Con.....	.40	.45	.40	.50
Excelsior.....	.40	.45	.35	.45
Grand Prize.....				
Gould & Curry.....	.75	1.10	1.05	1.85
Hale & Norcross.....	.90	1.00	1.00	1.60
Justice.....	.10	.15	.10	.15
Kentuck.....	.25	.30	.20	.30
Lady Wash.....	.15	.20	.15	.20
Mono.....	.50	.75	.50	.70
Mexican.....	1.55	1.70	1.50	2.20
Nadavita.....	.15	.20	.10	.10
North Belle Isle.....	.30	.30	.30	.35
Over Queen.....	.40	.45	.45	.45
Orcutt.....	.40	.35	.45	.45
Ophir.....	2.60	2.8	2.65	3.00
Overman.....	.35	1.15	1.05	1.20
Potosi.....	1.15	1.80	1.65	2.30
Peckless.....	.15	.25	.15	.25
Perr.....	.15	.25	.20	.15
Savage.....	1.0	1.40	1.30	1.65
S. B. & M.....	.50	.70	.60	.75
Sierra Nevada.....	1.55	1.65	1.60	2.25
Union Hill.....	.10	.20	.15	.20
Scorpion.....	.10	.20	.25	.30
Union Con.....	1.30	1.40	1.35	2.00
Utah.....	.40	.45	.35	.50
Yellow Jacket.....	.35	1.25	1.65	1.45
Assessment not made.....	.35	1.25	1.65	1.45

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Dynamos and Electric Motors

FOR THE TRANSMISSION AND DISTRIBUTION OF POWER



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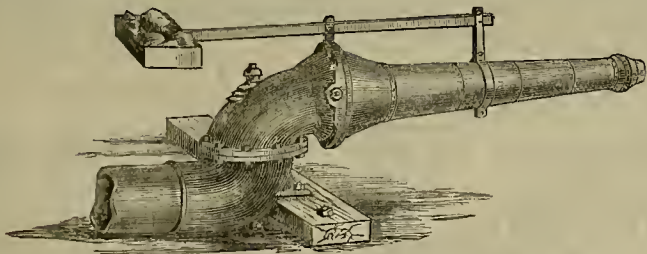
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The Dynamos and Motors manufactured by this Company develop the highest mechanical efficiency; they require little or no attention, are almost noiseless, and run with an entire absence of sparks at the brushes, rendering the daily trimming of brushes unnecessary.

Electric Power Apparatus for Quartz Mills, Hoisting, Pumping, Drilling, and all Mining Work, where Long Distance Transmission is desired, a Specialty.

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THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture, and which are pronounced far superior to the SINGLE-JOINTED style. The latter, however, we furnish when requested. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent upon application.

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Combined with Steam Shovel or Dredge.

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NEW METHOD OF PLACER MINING.

Saves all the Gold. Uses very little Water. Treats large quantities at Low Cost.

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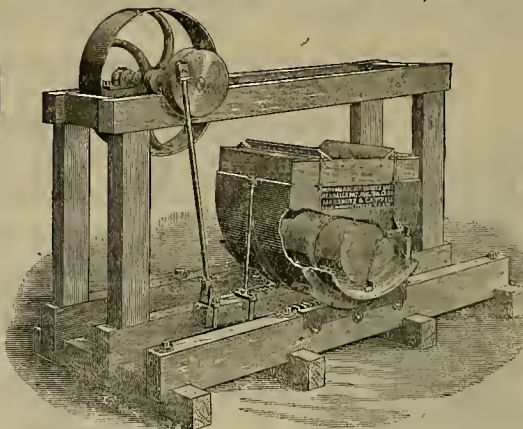
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NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



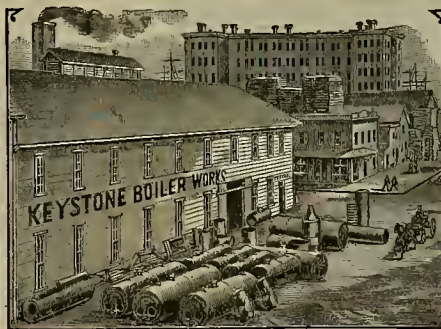
The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
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4. The power to drive it is less than one-half of stamps.
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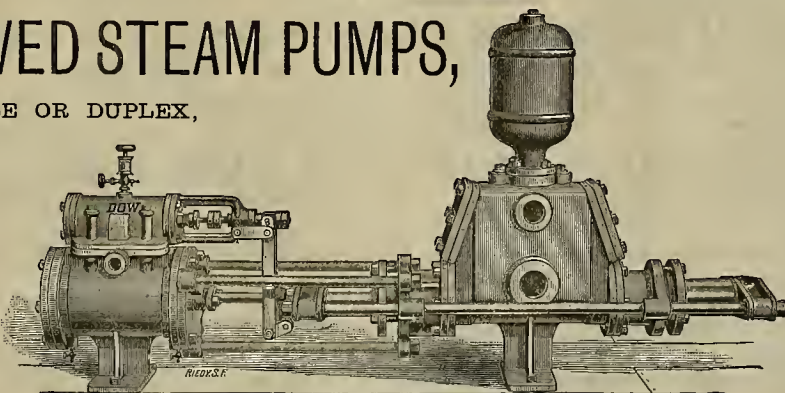
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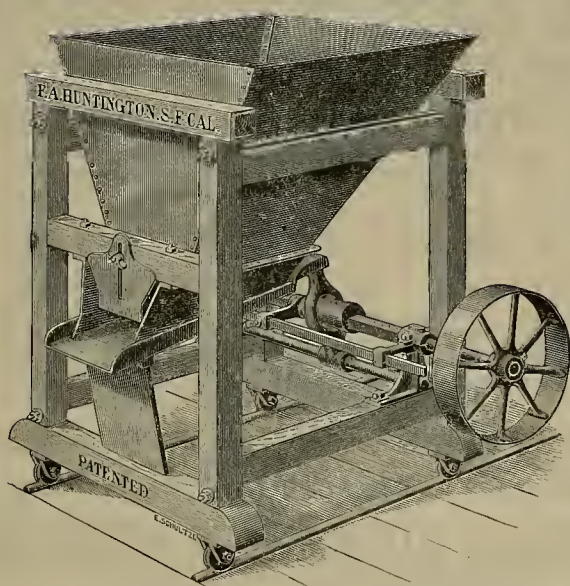
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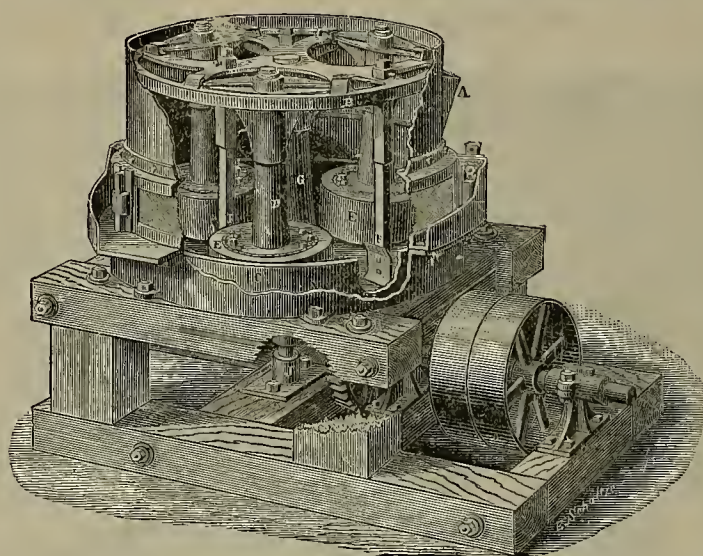
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This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

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Affords the most simple and reliable power for all mining and manufacturing machinery. Adapted to heads running from 20 up to 2000 or more feet. From 20 to 30 per cent better results guaranteed than can be produced from any other wheel in the country.

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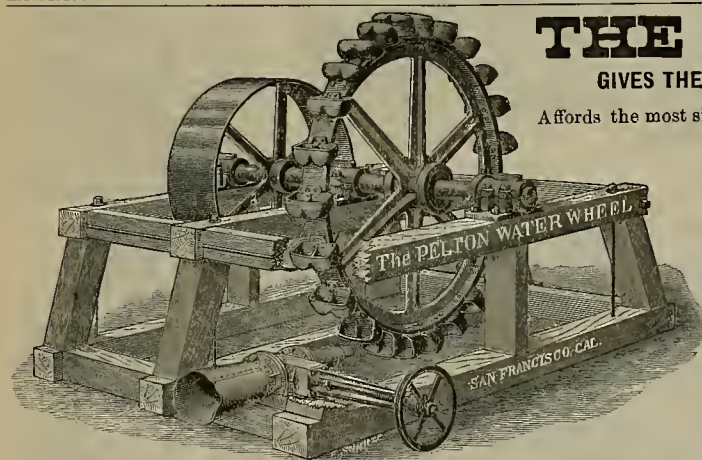
All applications should state amount and head of water, power required and for what purpose, with approximate length of pipe line. SEND FOR CATALOGUE.

THE PELTON WATER WHEEL CO.

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THE PELTON WATER WHEEL CO. 121-123 Main Street San Francisco, General Western Agents.

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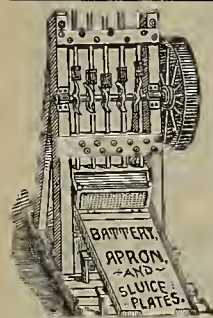
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E. G. DENNISTON, Proprietor.

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Extra sizes and lengths made to order on short notice.
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FRUE ORE CONCENTRATOR

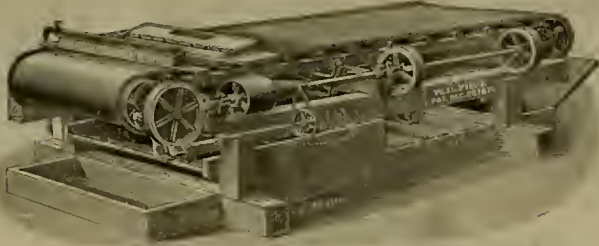
OVER 3000 IN ACTUAL USE.

We are now manufacturing these machines in different styles. The regular Four-Foot Plain Belt Frue Vanner is on the market now in its latest and most improved form, having several improvements so it that facilitate the work, altogether making it a perfect machine.

We are also manufacturing a Four-Foot Frue Vanner with a belt having an improved surface which doubles its capacity. This machine is as perfect in every way as the regular machine, and with its improved belt, it has double the capacity of the ordinary machine. We have sold a large number of these machines, and have demonstrated that they are a success.

The above figures of the member of machines that we have sold tell the tale of their popularity, and show that they have made their reputation by doing their work perfectly.

For any further information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.



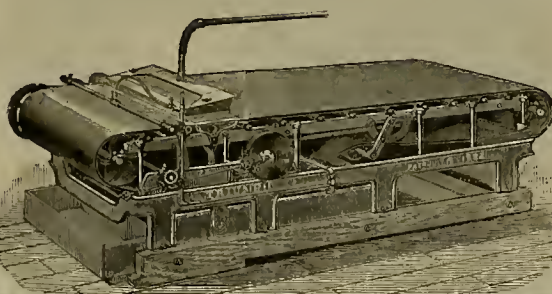
Manufactured under Patents of April 27, 1880;
September 18, 1883; July 24, 1888;
and March 31, 1891.

Price of Plain Belt Frue Vanner, \$575, f. o. b.
Price of Improved Belt Frue Vanner, \$825, f. o. b.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., No. 132 Market Street, San Francisco, Cal.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frue" have improved (corrugated) belts does not militate against the superiority of the "Triumphs" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.



(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.

DAVID McKAY, Jr.,
Supt. North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - \$550 f. o. b.

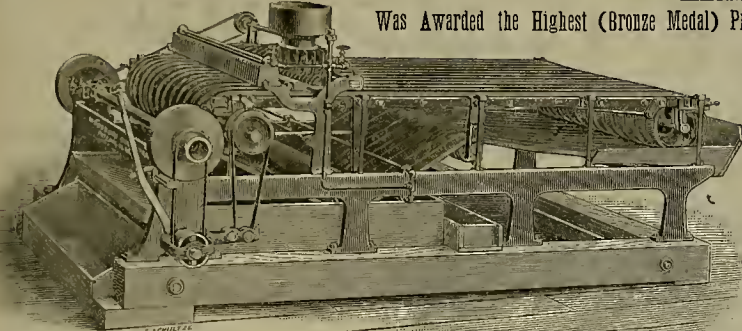
We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for sale if we can be convinced.

Circulars and testimonial letters furnished on application.

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

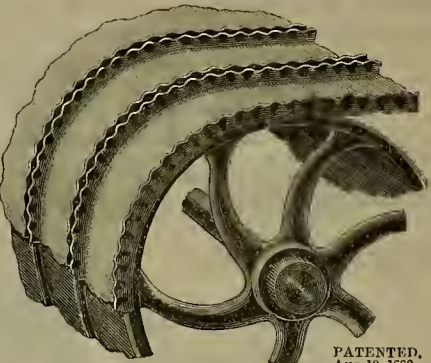
Was Awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891.



More than Double the Capacity
With One-Half Less Power and Occupying Less than One-Half the Space of any other Concentrator.

Built of Best Steel and Wrought Iron.
STRONG AND DURABLE.
Price - - - \$575 f. o. b.
Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. This excess in length of material effectually prevents the edges from cracking; plain edge belts have to stretch about one inch to the foot as they pass around the drums. This continuous stretch cracks the edges. The improved belt obviates that difficulty.

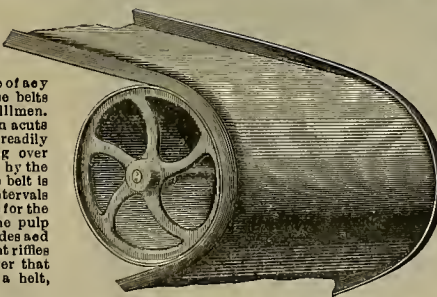


GEO. E. WOODBURY, Man'fr, 213 to 219 First St., San Francisco.

THE BLASDEL
CONCENTRATING BELT COMPANY.

We have now made arrangements to have our new Concentrating Belt manufactured in San Francisco; we can therefore fill all orders on short notice. The length and width of these belts are the same as is used on the Frue or Triumph Concentrating Machines, but can be made of any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight ruffled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from backing on the sides and forming channels through the center. These slight ruffles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth.



H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.

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MINING AND QUARRYING
MACHINERY,
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SQUARE FLAX PACKING.
MANUFACTURED FROM STRICTLY FIRST-CLASS FLAX AND PURE LUBRICANTS. HAS NO SUPERIOR for all Hydraulic Work.
CALICO WATER WORKS CO., CALICO, CAL., Dec. 16, 1890.
W. T. Y. SCHENCK—Dear Sir: We find your "Red-Cord" Square Flax Packing the "Best." Yours truly,
J. R. LANE, Secretary.
The red cord runs the entire length. Put up in boxes of 20 feet, or coils of 60 to 80 lbs. For sale by all dealers. W. T. Y. SCHENCK, Sole Manufacturer, 222 and 224 Market Street, San Francisco, Cal.

Adamantine Shoes and Dies
—AND—
CHROME CAST STEEL
Cams, Tappets, Bosses, Roll Shells and Crusher Plates.
THESE CASTINGS ARE EXTENSIVELY USED IN ALL THE MINING STATES and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.
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Special attention given to the purchase of Mines and Mill Supplies.



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IMPROVED MINING, MILLING, MARINE AND OTHER MACHINERY OF ANY REQUIRED MAGNITUDE.

Direct Acting Hoisting Engines,
Geared Hoisting Engines,
Friction Hoisting Engines,

Portable Hoisting Engines,
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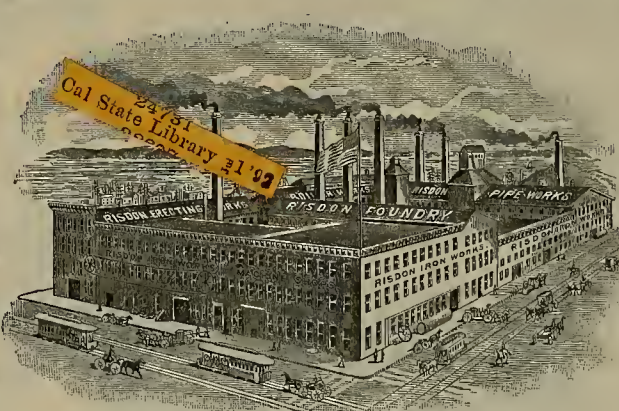
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SHEET STEEL AND IRON PIPE,

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Designs and Patterns of the Largest and Most Complete Mining Machinery.

High Pressure, Condensing, Compound, Triple and Quadruple Expansion Marine Engines. Marine Boilers of every type.
All Kinds of Marine Machinery.

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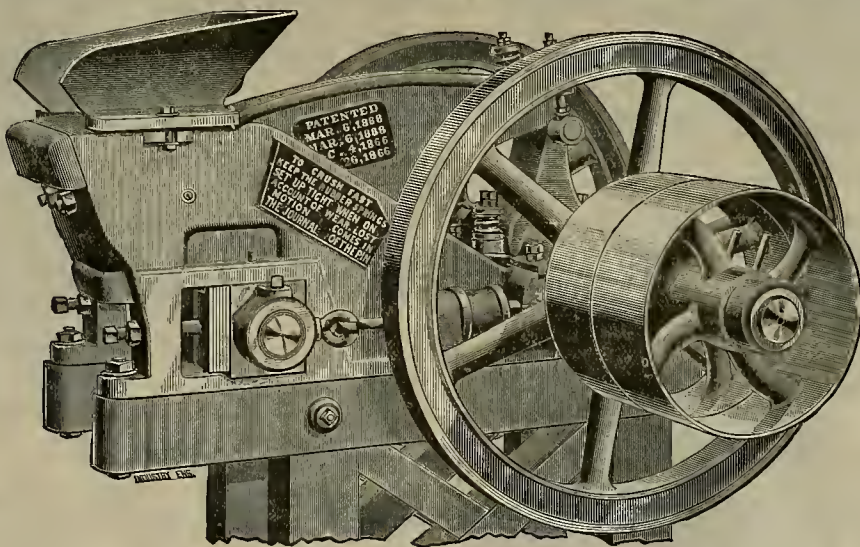
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DODGE IMPROVED ROCK BREAKER.

INGERSOLL - SERGEANT
ROCK DRILLS,
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— AND —
COAL MINING MACHINERY.

WATER WHEELS,
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IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
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Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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521 & 523 Market St., San Francisco,

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Assayers' and Mining Material.

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BATTERY SCREENS AND WIRE CLOTH.

Agent for HOSKINS'

HYDRO-CARBON ASSAY FURNACES

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV. — Number 7.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, FEBRUARY 13, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Old and New in Hydraulic Practice.

The wheel illustrated on this page is of the type commonly known as the overshot or gravity wheel, and is unquestionably the largest and most expensive water wheel ever constructed. It is located at Laxey, on the Isle of Man, a small island in the Irish sea, off the west coast of England.

This wheel is 72 feet in diameter, and is supposed to develop about 150 horse power, which is transmitted several hundred feet by means of wooden trussed rods having supports at regular intervals, to the bottom of which are attached small wheels running on iron ways, for purpose of lessening friction. The power thus transmitted operates a system of pumps in a lead mine, the duty of which is raising 250 gallons of water per minute at an elevation of 1200 feet. The water is brought some distance to the wheel in an underground conduit, and is carried up the masonry tower by pressure, flowing over the top into the buckets.

This great wheel was constructed some 40 years ago, and is said to have been running continuously during all this time, even making its monotonous rounds on the Sabbath, much to the annoyance of some of the old Scotch Dissenters who look upon it as a want of respect for the sacredness of the day. It is the great attraction of the place, hundreds of visitors making the trip to the island every year to see it.

The illustration affords a very good idea of the progress made since that time in hydraulic engineering, and is reproduced for the purpose of showing, by way of comparison, the advantages of the modern and now generally accepted method known as the Pelton system of power. The little cut in the upper corner represents a Pelton wheel of corresponding capacity (under similar conditions of head and water supply), being drawn to the same scale.

This Pelton wheel is a California invention, the result of the scientific development of the old "hurdy gurdy" wheel so commonly used in our mining regions in the early days. The Pelton wheel was used in California many years before its remarkable efficiency was recognized elsewhere, but now it is being applied all over the world. The mechanical construction is so simple and inexpensive, and the results so very satisfactory, that the use of the wheel is becoming indispensable, especially for mining, milling and electrical work.

The efficiency of the Laxey wheel, taking resistance into account, it is estimated, cannot be more than 65 per cent of the theoretical power, while the Pelton will develop fully 20 per cent more, and in size and appearance is a mere toy as compared to the ponderous piece of machinery shown, with its massive column, arches and stone foundations.

The most striking contrast, however, will be seen in the matter of cost, which is so

much less as to make a comparison almost absurd. While no data is at hand in regard to this, it is apparent that it would be at least as one to fifty in favor of the Pelton. Such an object lesson is of value in showing the wonderful progress made in engineering practice during the last half century, in bringing the forces of nature

city, who declined to give the \$1000 they at first voted, did so not because they were unwilling to give, but because the law prevented their appropriating money for such purposes. They passed suitable resolutions at their meeting favoring the miners' move.

The delegation to Washington had a long conference with the Governor of this State

A Foundry Purchase.

The Union Iron Works of this city have purchased the Pacific Iron Works, and will in future run the latter shops as a part of the Union Iron Works. The purchase includes the tools, patterns, drawings, engines, boilers, shafting, etc., and good will, but not stock manufactured or in process of manufacture, and not the accounts. The business of the Pacific will be for the present continued by the Union under the superintendency of Willis G. Dodd, so long and favorably known in connection with the foundry business of the Pacific Iron Works.

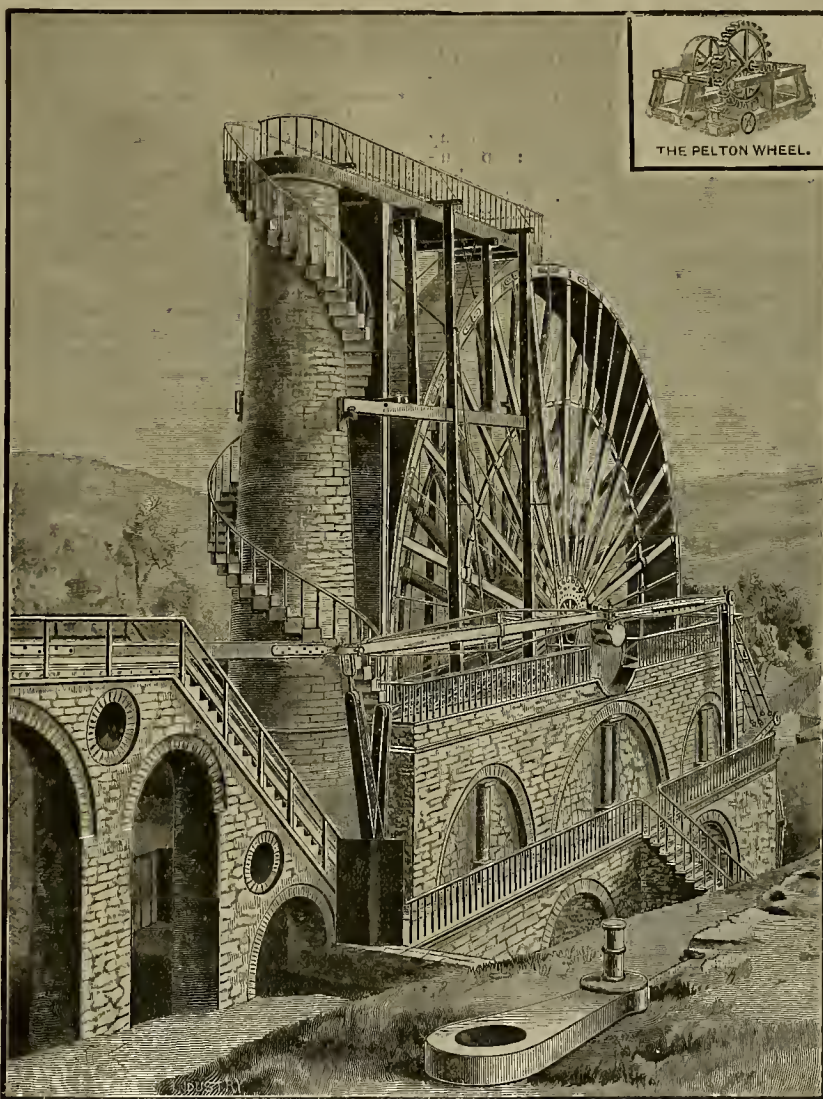
The ship-building department of the Union Iron Works at the Potrero has been brought to such proportions as to absorb a large portion of their work and space, and they have found it necessary to keep up with the mining machinery portion of the business, which is also large, to have such increased facilities as the purchase of the Pacific give. The latter shops are well equipped with good tools, and they have special facilities for manufacturing the Pacific water jacket furnaces, the improved White-Howell ore furnaces, the Dodd water wheel, etc.

This down-town branch shop of the Union Iron Works will doubtless give them also facilities for obtaining a certain class of small and repair work. It certainly will be much better for their mining-machinery department. With these two separate shops, the Union is better than ever prepared to take any class of work, large or small, that is required.

THE GOOD FEELING between the two formerly contending factions continues. At the last meeting of the Miners' Executive Committee, Senator John Boggs of Colusa addressed the committee, and said the people of the valley generally wanted hydraulic mining resumed, as it would give a home market for supplies and bring prosperity to the interior of the State. He said that he knew that the delegates appointed at the River Improvement Convention at Sacramento would work in harmony at Washington with the delegates of the Miners' Convention.

THE MAMMOTH CLAIM.—The Supreme Court of Idaho has decided the case of the Mammoth mining claim vs. the Lackawanna mine at Wardner, Idaho, in favor of the Mammoth claim, reversing the judgment rendered by Judge Sweet on the verdict of the jury in August, 1890. This suit involved land claimed by the Sullivan mine, and is adverse to the Bunker Hill and Sullivan and in favor of John M. Burke and his company, owners in the Mammoth claim.

SHASTA COUNTY will shortly have a permanent Miners' Association. A meeting will be held at Redding March 1st.



THE GREAT OVERSHOT WHEEL AT LAXEY, ISLE OF MAN, ENGLAND.

into subjection, and making them subservient to commercial and industrial purposes.

The Miners' Movement.

Everything connected with the newly formed California Miners' Association is going on well. The delegates to Washington are well on their way to join those who went from the River Improvement Convention. Several measures are under consideration in Congress looking toward appropriations for the rivers, and debris dams are also being considered.

Money is being collected to defray the necessary expenses and is coming in at a satisfactory rate. The Supervisors of this

the day before they left. He has aided them in every way, advising them as to the proper course to pursue, and giving them letters to influential men.

The House Committee on Rivers and Harbors seems to be favorably disposed, and it is only to be regretted that the miners' delegates were not in Washington a week ago to appear before them.

In several counties preparations are being made to organize permanent branches of the State Miners' Association, and in a few months doubtless there will be some thousands of members. The Executive Committee appointed is a very active one, holding frequent meetings and transacting a great deal of important business.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—ED.

Mining in Arizona.

Cause of Failures in Mohave County.

MINERAL PARK, MOHAVE CO., }
ARIZONA TER., Jan. 24, 1892.

TO THE EDITOR.—Perhaps some of your many readers would like to read a brief history of facts concerning mining in Mohave county, Arizona, for the past 20 years, and the mining industry as it now is. I happen to have been a resident of the county for almost that length of time, and ought to know whereof I speak, as I am one of the few that did not come to Arizona to learn my business—mining.

I will say that Mohave county, Arizona, has been cursed with more genuine frauds and hilks than ever before graced a mining camp with their presence. They come here as superintendents for mining companies, and it seems that the mining companies do not discover the mistake until their superintendent (?) has blown them in, all the way from \$5000 to \$50,000. Then they curse the country and everybody in it. Do they curse the superintendent? Oh, no! he is one of the family; he is a man of marked ability, when in fact, his ability perhaps lies in the direction of drinking, gambling, or spending the people's money on worthless propositions; the money of the people who have confided in him and thought he did know something of what he was trying to do, perhaps mining or running a mill. The first mining company which operated in this district was the Keystone Consolidated Nos. 1 and 2, which had for its superintendent, a man named Canfield. It built the Mineral Park Mill, situated in the wash west of of town, in 1875 and 76.

It run out its first bar of bullion on the 22d day of Feb. 1876, from ores which the superintendent bought from chloriders at these rates: \$50 per ton for crushing—80 per cent of the assay value—15 per cent discount on bullion, and from 2 to 8 per cent moisture, and gave his check for the amount due. He worked that ore up to only 60 per cent. Of course a millman can see he was losing money. The mill was turning out from one to two bars of bullion a day, worth from \$1000 to \$1500 per bar. Unfortunately for the county, just at that time we had no rail facilities. We got about one mail a month for about three months, so you see, the devil favored his own. Finally the checks came back endorsed and "not paid for the want of funds," the superintendent left and has not paid us a visit since. He reported to his company, no doubt, "there was nothing in the country." The merchants here, Breon & Spear who had a considerable hill against the company for supplies furnished, bought up all the claims the miners and chloriders had against the company; some for 50 cts. and some for 25 cts. on the dollar.

Finally they got a judgment; the sheriff stepped in, sold the whole business and the merchants hid it in. The firm concluded they would start it up; they knew as much about running a mill and crushing ores as a Wallipi Indian knows about a coffee mill. So they sent to Sao Francisco and hired the finest (?) millmen on the coast, in fact some of them represented themselves as Freiburgers, and they knew it all. After monkeying around and getting the mill in shape to run at an expense of \$2000, they started up and run a few weeks, with the same result—behind. The excuse was, the ore was too base; most of it chloride ores, mind you, and it was impossible to work it, consequently the mill laid idle again for about a year, and the miners were shipping most of their ore to San Francisco at a cost of \$100 per ton freight. During all this time, Messrs. Breon & Spear, having confidence that some day something or some man might possibly drop in who knew how to get the precious metals out of the ore, kept on buying some and stacking it up, and as they were furnishing some chloriders with the necessities of life, tools, etc., to work the prospects with, the ore accumulated on their hands at the mill. Old Ben. Spear made another trip to San Francisco to find a millman that might have some knowledge of metallurgy. He found one named Tyler, who was highly recommended as being "the boss." He was brought down and looked over the mill, which, by the way, was one of the best five-stamp mills on the coast. He had some alterations to make on the mill at a cost of about \$1000, got everything ready and started up. He crushed all the ores which had accumulated and more that came in during the time. Finally they made a cleanup, and old Ben found himself \$6000 behind. I never saw any man look bluer than old Ben. Spear did; his underlip

hung so low that he could have licked up the last bean in the bottom of the pot. We all felt blue. What in the name of heaven is the matter? Mr. Tyler takes his little gripsack and goes back to San Francisco, where he came from, and tells people that the ore here is so base it cannot be worked to a profit.

The mill of course lies idle for about another year; and all this time old Ben the merchant is supplying the boys with what they need, and what ore is not shipped out of the country is piled up at the mill.

About this time the Hackberry Mill and Mining Co. is organized and they are building a new 10 stamp mill on their property. They get all ready and start up and run for about 10 days. They cleaned up and made a successful run. The ore was worked up to 90 per cent of the assay value, and it was 60 per cent baser than any ores worked up to that time at the Mineral Park mill. How could that be? Simply because they had a man who understood his business. It was like the fellow in Arkansas playing the fiddle "he knew just what to do."

Old Ben got on his buckboard, went to Hackberry and interviewed the gentleman who was running the mill, who told him that he just simply wasn't chloridizing his ores. "You are not using salt enough." He came back and started up the mill again. He crushed all the ore he had about the mill; made a cleanup and found that they had worked the ore up to 90 per cent under the management of Mr. L. J. Lasalle. They then went to work and worked over all the tailings, about 1500 tons, and worked them up to 95 per cent. Of course Old Ben got all his money back and more too; he had cause to rejoice, and I will say we all did.

But just at that time an Eastern company steps in and buys the property; it put up \$25,000 as a working capital and in a short time dividends would be paid. But alas, in a few months it called for more "mud." Then the stockholders got disgusted, the property was not fairly represented, it was exaggerated, the company was not composed of mining men. They felt like they had been robbed and they wouldn't put up any more money, nor they wouldn't do anything. Finally they found themselves in a lawsuit; the lawsuit was finally settled by the party being nonsuited. The company discontinued and formed a new company, with Allen W. Thurman of Ohio as President; which is the present owner. The stockholders claim they put up \$25,000 as a working capital. They sent out a theoretical gentlemen to run the business, and in a short time the money is all gone and he makes a failure.

Will he kindly tell us where the money was expended? The mill lies idle for years again. Good responsible parties were anxious to lease it, but no, Mr. Thurman and his superintendent, Mr. Sperr do not want it leased; why, please tell us why. In a short time there is another assessment levied, they raise \$5000, and put two men to work in charge of the mill and mine to run it, who never saw a piece of ore in their lives, until they came to Mohave county, and did not know a piece of ore from a piece of granite. Of course they could learn, as this is a good school; consequently another failure resulted.

Mr. Thurman on his way to San Francisco on an electrocoring tour about four years ago, dropped in to see us. The writer of this article with some parties who were connected with him, wanted to lease the mill, oh, oo! Mr. Thurman was highly pleased with the way everything looked at the mill and mine and consequently when he got to San Francisco he was going to buy the machinery which the mill was in need of, to work his ores and all the mines' ores in the district. He did not care about leasing the mill at all, and in less than three months we would see a different camp here altogether. Mr. Thurman goes to San Francisco with his superintendent, Mr. Sperr, and there they are wine and dined by the good people of San Francisco, and after he gets to his home, in Cleveland, Ohio, a reporter of a Cleveland paper interviewed him as to his trip to the west, and Arizona in particular. In that interview the gentleman had the gratitude (?) to say that Arizona was the most God forsaken country he ever saw. He never bought a pound of machinery, and there the mill lies idle and decaying, until now it is not safe to run, and nobody wants it. It simply stands there as a monument of bad management. There is no good reason why the mill should ever remain idle one week. There are tons and tons of ore in sight—and Thurman's attention was called to it—which will pay to work here, but will not pay to ship. But no; he is like the dog in the manger.

Another heavy man drops in on us from Aspen, Colorado; his name is E. K. But-

tholf; he represents millions; he leases and bonds property, agrees to do everything or anything and finally winds up by doing nothing that he agreed to do. On some property he had under lease and bond, he agreed to do the assessment work for the year 1890; he got parties to do \$50 worth of work on the claims and then exacted a receipt for \$100. Now, that is the kind of capital that we are unfortunately cursed with.

Mohave county has been cursed with another lot of individuals which I will term middlemen. They come here and get in the good graces of the miners. They will lease and bond their claims for a small amount; some as low as \$500. They perhaps will go into California or Colorado and exaggerate to monied men, and they will want them to put up ten or fifteen thousand dollars on the same property. By the aid of an accomplice here, they sometimes win. It is only about two years ago that a man was in the East selling stock on a worthless piece of property that he or the company has not owned for 12 years. Gentlemen, let me tell you what is a fact. Arizona is getting tired of such treatment. You fellows have had your day. She is getting tired of seeing good people robbed of their good money. She is getting cursed for it.

It has got so in some localities in the East and West that if a person tries to introduce a piece of property in Arizona they will throw up their hands in holy horror, as if you wanted to take their life; even with people who never saw or never invested one dollar in the country. Now, gentlemen, why is it? There is no good reason for it. There is a world of property here lying idle at present that were it anywhere but here, it wouldn't be idle an hour. There is good property here that you can get by simply locating it—property that has produced thousands of dollars in an early day. But you must not expect to find it on top of the ground now. You will find the miners liberal to a fault. They will divide the last bean with you, if they think you are a man.

If you want to buy a piece of property, don't buy through middlemen. This camp has been self-supporting, and there is neither money nor enterprise here over and above what comes out of the ground by the aid of a windlass. There is no capital operating here, except the kind mentioned. The ledges are large, and some of them are well defined and good. The climate is excellent. If you hear anyone saying it's a "God forsaken country," simply tell them I say they lie. And if there is anyone in the camp who tells you there is nothing here and he is going to leave (but he stays, he can't be driven away), you can think what you please of him. I think he is a curse to any camp and the quicker the camp is rid of him the better. Yours, JAS. W. HAAS.

Concentrators at the Tyro Mine.

COULTERVILLE, Cal., Jan. 25, 1892.

TO THE EDITOR:—Your information gained from the Mariposa Gazette of January 16th, in regard to the Tyro (not Tyora) mine, and the three concentrators needed to handle the pulp in a satisfactory manner, was a little wide of the mark. The truth of the matter is that Mr. Sutherland, the superintendent of the Tyro mine, tried one "Tullock" concentrator, for which the manufacturers claimed a capacity of five stamps. After a trial of some three weeks, which was a failure, the man in charge (sent there by the owners) claimed that it would take at least three "Tullock" concentrators to handle the pulp from the five stamps, and was not sure that with three the results would be satisfactory.

The results being so poor, Mr. Sutherland at once bought two plain-belt Frue Vanners, and removing the "Tullock" had the Frues erected instead, and they are giving results which exceed even Mr. Sutherland's expectations.

The two plain-belt Frues are handling all the pulp from the mill, producing a grade of concentrations that are worth several hundred dollars per ton, and give the best possible results. Mr. Sutherland is highly pleased at the change and says that he will always stand by the Frues, and wants no more experimenting for him. Yours truly, H. S.

If any miner has any practical suggestions concerning proposed amendments to the mining laws, let him give them in writing to the Secretary of the Miners' Association and they will be duly considered by the Committee appointed by the Convention.

THE mining question will be pretty well ventilated during this Congress, if all the measures proposed are considered.

Geary's Mining Bill.

Congressman Geary has favored us with a copy of his mining bill introduced in Congress Jan. 5, 1892, as follows:

A BILL TO REGULATE MINING IN CALIFORNIA.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

That the Secretary of War shall assign three officers of the United States Army Engineer Corps, located in California, who shall have supervision of all operations conducted in said State of California under the operations of this act, and who shall be known as the United States Mining Commission of California.

SEC. 2. That all owners of mineral land situated in California, capable only of being mined by what is known in California as the hydraulic process, shall, before proceeding to operate such mine or mines, file with such Board of Engineers an application for a license to conduct such mine, and in such application shall designate the location of such mineral land, the number of acres and the mode of mining desired to be employed or used. On receiving such application, together with such sum of money as will defray the expenses of such commission in performing the services herein provided for, such commission shall examine such proposed mine and its surroundings, and shall determine whether such mine can be operated without doing any material damage to the navigable waters of the State of California or not. If the decision is that such mine can be operated, they shall issue a license allowing him to mine the land described in his application. If such commission shall decide that, by the erection of suitable dams or other appliances, such proposed mine can be operated without doing any material injury to the navigable waters of the State, such commission shall designate the character and kind of preventive work required before allowing such proposed mines to be operated, and the place or places where the same shall be erected or constructed, and the material to be used thereon, and the size of the same. Upon the completion of such preventive work, if constructed to the satisfaction of said commission, said commission shall issue its license permitting such mines to be operated. Any deposit made in the navigable waters of the State from mining operations not greater in degree than the deposit or wash usually deposited in rivers or streams from a like area of agricultural lands as usually plowed or worked, shall not be considered as producing any material damage to the navigable waters under the terms of this act.

SEC. 3. That the license herein provided for shall, when issued and while in force, be, in all proceedings in the courts of the United States, conclusive evidence that the work or works conducted or prosecuted in compliance therewith is not a nuisance.

SEC. 4. That the commission shall have the power at any time to revoke such license for violation of its terms, or when, in their opinion, any mine is producing any material damage to the navigable waters of the State. No change shall be made in the mode of working any licensed mine or increase made in the area worked without first obtaining the permission of said commission.

SEC. 5. That the sum of two hundred thousand dollars is hereby appropriated for the construction and erection of suitable dams at Bullard's bar and at such point on the north branch of the Feather river as shall be designated by said commission. Said commission shall make, or cause to be made, the necessary surveys, and shall prepare all plans and specifications for such dams; and the contract for erecting such dams shall be let by the Secretary of War in the manner provided for letting contracts.

SEC. 6. That all laws in conflict herewith are hereby repealed.

THE Nevada Transcript, which has been fighting for the hydraulic miners for 12 years, wants no more humbugging and says the hydraulic miners must act in good faith. It publishes the resolution requesting them to stop illegal mining, and says: "We would have continued this fight for an indefinite period had not the valley men joined hands with us to work for the common good and acted nobly and honorably toward us. A bargain has been made, and we are for the common cause and against any and every violator from this day henceforth."

THE richest county in the State—San Francisco—is so poor that it cannot afford to give a cent to further the mining interest, when other counties, in both mining and farming regions, have given both moral and financial support.

River Beds.

Some Suggestions for Removing the Sediment.

W. W. Waggoner writes to the Sacramento News as follows:

Among the most interesting of the phenomena of nature in California, either from a geological or an engineering standpoint, are the floods of the Sacramento river, and the effects due therefrom.

The Sacramento river and its tributaries have their sources in the lofty summits of the Sierras, where the annual precipitation reaches as high as 102 inches a year. This falling during the winter months, taxes the carrying capacity of the river to the utmost. During winters of heavy precipitation the banks are overflowed and great damage done.

The descending floods are nature's method of filling the valleys, leveling the earth's crust by depositing at levels the detritus of the mountains, composed of sands and vegetable mold so valuable to a fertile soil.

When nature has full sway, these descending waters, laden with their silted load, deposit the heavier matter as soon as the velocity is slackened, either in the bed of the stream or on the overflowed land, the lighter matter being carried along with the seething waters only to be dropped nearer the sea or carried in suspension to finally settle on the ocean's bed.

This continual overflow and deposition gradually raises the general level of the overflowed lands.

With the settlement of the valley, levees are constructed to confine the floods within their natural banks, usually with little avail. The waters, as if bent upon full sway, deposit the load in the bottom of the streams, forming bars, raising the bed higher to overcome the obstacles in the way.

The inhabitants, equally determined, raise their levees higher, higher; the result being that in the course of years the river rolls to the deep in a bed far above the level of the surrounding country, while the people rest uneasily at the impending danger of an overflow, with its disastrous results.

The Sacramento and its tributaries illustrate, while the river Po has been cited in the text books on geology as an example of this law.

With the settlement of the mountains, the hillsides that were covered with timber and low matted shrubbery (Nature's restraining works) are cleared away, the soil upturned, the work of erosion goes rapidly on with an increased pace. And with difficulty does the farmer prevent his soil from joining the debris of the landslides or the natural wash of the uncultivated portions.

Concerning the flow and filling of the Sacramento river, much has been written, but comparatively little has been done by way of improvement.

The problem is great on account of the annual precipitation coming in such a short period of time. In the outline of a scheme of improvement the problem may be divided into two factors.

First—Increasing the capacity of the existing streams, that the waters may be discharged into the sea as rapidly as possible, thereby preventing the flooding of the surrounding country.

Second—The prevention of the detritus from filling the watercourses, thereby diminishing their efficiency.

On the first division I will not enter, but desire to call attention to a few points that may lead to the solution of the second.

In considering the second division, it is well to note the sources of supply of the debris. Of the natural wash, much has been said concerning it in the controversy between the miners and farmers. By the latter it is stoutly denied that it is as great as is claimed for it. A little observation in the foothills, either of the Sierras or the Coast Range, will satisfy any one of the magnitude of the natural wash, and a perusal of the report of the engineers, either of the General Government or of the State, will surprise any one as to the quantity of debris annually sent down from the sections wholly agricultural.

The reason of this difference of opinion is, that it is washed off during the winter rains, and its effects cannot be clearly seen.

During the first decade of mining, surface mining was at its highest; the amount of fine stuff and sand was greater than was found in the ancient river channels and was carried rapidly to the level lands. Of the gravel still in the creeks, it is coarser and is moving more slowly toward the valley.

Since the cessation of hydraulic mining, the mountain streams during the winter floods have been clearing their channels, carrying the sands onward, steepening its grades that were lessened by the deposits, so that to-day most any of the mountain

streams will show that the gravels have been washed out 20 feet in depth.

In future years, unless some obstruction is placed in the way, there will be a greater quantity of coarse matter discharged annually than has been in times past.

The sands and gravels are accumulating at the mouths of the streams, where they debouch from the mountains ready to be carried into the rivers at each succeeding flood. The beds of the rivers that are now deeply filled will receive greater additions.

The danger from floods will also be increased, since the waters from the mountains will be moving with greater velocity on account of these steeper grades.

To improve the channels and arrest these moving sands, but little has been done, save a few small dams constructed by miners and farmers to turn the water into their ditches. For permanent relief, it was proposed by the farmers, backed by the mandates of the court, that the hydraulic mines be shut down. So far, little benefits have been derived from the plan, because the tailings will continue to drift down for years to come, and the natural wash will be increased with the clearing of the forests and settlement of the mountain lands.

Restraining dams have been proposed. Whenever properly built, they will be found effective, being in reality retaining walls for banks of sand and gravel. Their efficiency ceases when the grade of the channel back of them is sufficient for the floods to carry their load of debris over them without depositing any. These have been proposed for favorable places in the streams coming from the mining regions.

But to impound debris so that at no time will it be in danger of being washed over the restraining works, the dams should be built in places out of the channel of winter floods.

Besides these deposits, the great mass of sands at the mouth of the streams should also be restrained from entering and filling the main water courses.

To do this at the least expense and effectively, to my mind, will be to construct a large canal to carry the flood waters from where the mountain streams leave the foothills, out of its old bed, around the great mass of tailings and discharge it into the river below.

By constructing a dam at the stream's mouth with a wide and carefully designed waterway, together with properly located levees on each side, the waters, during the low stages and ordinary winter floods, will enter into a large lake, their impurities settled and discharged comparatively clear into their old channels, thereby not affecting navigation.

During times of great flood, the surplus water flowing through its new channel, freed from its sandy bed, carrying but little sand with it, will discharge into the river ready to do its full duty in moving the already existing bars toward the ocean.

The Yuba river, having by far the most extensive banks of tailings, offers especial inducements for its improvement on these lines.

About two miles below Dugger Point the Yuba has always shown a tendency to break through the levees and flow out upon the lowlands into Dry or Reeds creek and discharge into the Feather river about eight miles below Marysville. By building a dam at a suitable point near this place, constructing a canal into Reeds creek about three miles in length, enlarging the creek and leveeing the whole throughout, the condition stated above will be fulfilled.

The present bed of the river, with a dam across its mouth, will afford a settling reservoir of upward of 20 square miles; that will effectively settle the immense deposit of sands in the Yuba from its mouth to Dugger Point, care for all the debris that will be washed down, as well as afford a settling basin for the hydraulic mines for years to come.

The danger of the Yuba cutting a new channel north of Marysville, diverting its waters with those of the Feather into the old slough west of that town, with its inundation, will be averted.

In addition to this settling basin, a large belt of lowlands east of the Feather river will be improved and reclaimed by a deposit of silt. The other tributaries may possibly be treated in like manner.

With this source of feeling eliminated, it will be possible for the Sacramento river to scour its bed, deepen its channel and obviate the necessity of building the levees skyward, as is now the increasing custom. Then, with a judicious correction of alignment, a watercourse is possible to be established equal to that of 40 years ago.

DO NOT GROWL NOW.—Since the Miners' Convention, where the miners and farmers joined hands in favor of the resump-

tion of hydraulic mining under restrictions agreeable to both parties, the feeling here has radically changed toward the Valleyites. Heretofore, when a load of goods arrived here from Marysville, the sight of it to most of our people affected them as bad as waving a scarlet flag in front of a bull. Things have changed now. On Tuesday afternoon a 16-mule team with a schooner and two back-actions, pulled into town laden with goods for some of our merchants. These goods were sent by way of Marysville, just to show the people down there that we had buried the hatchet as well as the tomahawk. May peace forever reign between the miners and the valleyites.—Nevada Transcript.

No Money for Miners.

The San Francisco Supervisors voted \$1000 toward the expense of the Miners' Convention Committee to Washington, and at a later meeting, on the same day, took it back. The question was raised of the Board's legal position in such a case—that is, whether or not it had the power to make such appropriation. The question was submitted to Counselor Durst, and his reply was filed, from which the following extracts are taken:

"I find no general law giving the city power to contribute money as above referred to, nor is there any provision in the city's charter that gives in express terms such a right. Section 95 of the Consolidation Act provides that payments of demands for certain enumerated objects shall be made, and none others. It is evident that if the municipality has any authority at all, to contribute to the expenses above referred to, it must be either by Subdivision 15 of Section 95 of said Act, which provides that expenditures authorized by the Board of Supervisors, in the lawful exercise of their powers, for objects other than those specified in the other subdivisions of the Section, may be paid out of the Surplus Fund, specified in Sections 97 and 98, but not otherwise; or by Subdivision 1 of Section 1 of an Act entitled 'An Act to confer further power upon the Board of Supervisors,' etc., approved March 30, 1878: 'To pay out of the General Fund not to exceed \$3000 per month for objects of urgent necessity not otherwise provided for by statute.'

"The municipality is created by Act of the legislature. It is an institution of the State, established for certain public purposes, and for effecting those purposes it is invested with certain corporate powers and is charged with corresponding duties—all either expressly or impliedly provided for in the statutes. It can exercise no powers but those which are conferred upon it by the Act by which it was constituted, or such as are necessary to the exercise of its corporate powers and the performance of its corporate duties. The Board of Supervisors has no authority to appropriate any of the revenues of the city, except to enable it to discharge some duty imposed by law, or to accomplish some object for which the corporation was created."

Mr. Durst adds that an excuse for such an expenditure could not be based on any benefit the city might hope to derive, because it could not be direct; it would only be incidental, and the city could justify financial aid to a competing railroad or the Nicaragua canal on equally good grounds, nor is such an expenditure an urgent necessity within the meaning of the Act. Urgent necessity, here, means those things that are of vital importance, and within the scope of its authority and the object for which it was created.

Impounding Debris.

The House Committee on Mines and Mining has agreed to report favorably Representative Caminetti's joint resolution concerning the mining debris question. The resolution recites the provisions of the act of Congress of October 1st, 1888, under which a commission, composed of members of the engineer corps of the United States Army, was appointed to investigate the mining debris question in California, and submitted a report thereon; and the fact that notwithstanding that said report absolutely shows the existence of "vast deposits of mineral lying in the canyons and plains below the foothills, portions of which will be carried down during the floods and eventually lodge in the streams," no estimate was made by the chief of the engineer corps of the amount necessary to commence a system of improvement required to restrain the mining debris where it is now lodged. The resolution says: "It seems from said report to be necessary to do so without delay in order to prevent its final lodgment in navigable streams, causing incalculable

damage, and also in order to make effective the expenditure of money in improving the Sacramento and Feather rivers. The Secretary of War is requested to submit for the consideration of Congress, such a further estimate of the amounts required, and which can be spent profitably during the coming year in making the improvements recommended by the commission to restrain the mining debris and prevent its lodgment in the navigable rivers."

Caminetti's idea is to get the matter before the Secretary of War again and have a new report made by Major Heuer, if possible, recommending that \$500,000 or \$600,000 could be profitably expended during next year. Congress might then appropriate 60 per cent or 70 per cent of this amount. Bills and resolutions concerning the improvement of rivers and harbors usually, if not invariably, are referred to the Committee on Rivers and Harbors in the House, but in this instance Caminetti so worded his resolution that it would appear to be a proposition affecting mines more than rivers, and consequently it was referred to the Committee on Mines and Mining, of which Caminetti is a member.

Mining Department at the World's Fair.

Chief Skiff of the Department of Mines and Mining has returned from a trip in quest of rare exhibits for his building, says the Chicago Herald. He visited New York and Washington scientists and scientific institutions, and was promised a number of rare displays. "Every, high and low, official and layman, teacher, scholar and truant is enthusiastic for the glory of the great World's Fair," said Mr. Skiff. "I have been promised a rare collection, in metallurgy, of iron from Russia and a number of noted castings from the same section. Geo. H. Kunz, the well known diamond expert, will send a valuable collection of antique mining literature. English, the great New York collector, will also send an elaborate collection of minerals. The Columbia School of Mines will make an exhibit in scientific demonstration. Prof. Foote of Philadelphia, who has already asked for space for his marvelous collection, starts abroad at once to make several important additions to it."

Chief Skiff visited the Geological Survey in Washington and had satisfactory interviews with Maj. Powell and Prof. Clark. Both these officials will supplement the work of the Department in various directions. Patent Commissioner Simmons and Mr. Rice will furnish a number of models illustrating the steps of inventions by which the present advanced condition of mining machinery has been reached. "This feature of the mining exhibit," said Chief Skiff, "will prove a very valuable and instructive one, as showing the evolution of mining in this country. Everywhere I went, people were deeply interested in the success of the Fair, and had no doubt of its unprecedented success. In incidental talks with members of Congress, I found nothing but the best feeling toward the Exposition."

The Last Chance Wins.

At Boise, Idaho, the jury in the notable case of the Tyler Mining Co. of Portland versus the Last Chance Co. of San Francisco and Wardner returned a verdict for the defendants. Both companies laid claim to a large body of rich ore which crosses both properties. Each company claimed priority of location. The case will be taken to the Appellate Court at San Francisco. The suit is probably the most important mining case ever tried in Idaho. The property involved, is on the great vein from which the Bunker Hill, Sullivan and other famous Coeur d'Alene mines derive their wealth, and the territory in dispute has been shown to be immensely valuable, at least \$1,000,000 being at stake. The litigation, which is an action in ejectment, began in August, 1891, soon after the Tyler people broke into the Chance works. About the same time an injunction suit was started and the injunction was granted by Justice Field restraining the Chance mine from working in the disputed ground. This order was so modified by Judge Beatty that work could be continued under the supervision of an agent of the court, who has handled the proceeds of the ore taken from the ground in dispute and who retains the profits subject to the direction of the court. The value of the ore taken out by the Chance Company is not known, but runs into the hundreds of thousands, the slopes being as large as good-sized houses. The ground has been producing three or four years, and there are said to be still many bodies of ore showing.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

El Dorado.

VAN.—Georgetown *Gazette*, Feb. 5: Messrs. W. D. English and Barry Baldwin, of San Francisco, came up last week upon business relating to the Van mine, and returned on Tuesday. They and Tom Newland have decided upon sinking the shaft 100 feet deeper, and we hear that specifications for bids will be made in a few days. E. W. Chapman of the Taylor mine is looking into the Eureka mine of this place with a view of purchase. This move is received with much interest by our citizens, as every miner who knows this mine and its history feels confident that once under the management of practical and progressive mining men like the Chapmans it will prove a valuable property. Gitchell Gulch continues to yield him golden nuggets weighing into the ounces. Tom Armstrong has struck new diggings this side of Jones Hill, which shows flattering prospects.

Humboldt.

THE OIL WELL.—*Western Watchman*: We are pleased to state that the temporary cessation of work at the oil well has come to an end. It was caused by the fact that the men who had been engaged for the skilled work of tempering drills, to come up for duty at the time the works were perfected and in readiness for operations, failed to meet their appointment, therefore in order that no half-way work be done, the operations ceased until the proper mechanical skill could be engaged. Two men were sent out on Tuesday of last week, and two more were sent out on Monday of this week. These will fill the complement of men required to run day and night, according to the program of the directors. It is thought by those who understand the nature of the rock to be pierced, that they will make at least 50 feet a day, and that if they have one month of good work without stoppage, the auger will sink 1500 or 1800 feet. We shall look for a definite report of operations next week.

Los Angeles.

BREA.—*Riverside Bee*, Feb. 4: An oil company, while prospecting in the hills west of Los Angeles, discovered a mine of brown hrea which they think will be a bonanza for them. It burns freely in stoves and open grates and is considered to be equal if not superior to coal for heating purposes, and is being furnished in Los Angeles at \$4 a ton. If it proves to be all that is claimed for it, and the supply is ample—and it is said the hills are full of it, it will do much toward solving the question of cheap fuel.

Napa.

QUICKSILVER SHIPMENT.—*Independent Callistogian*, Feb. 9: It is a number of years since the shipment of quicksilver from Calistoga in one month equaled those of January. The total amount was 1,181 flasks, or 90,346 pounds. The product of each of the four mines was as follows, the figures expressing the number of flasks:

Napa Consolidated.....	525
Gt. Western.....	319
Bradford.....	232
Sulphur Bank.....	105

In addition to the metal shipped from the Gt. Western there remain at the mine, as a portion of the product for the month, 50 flasks of metal.

The large amount of metal credited to the Napa Con. is to a great extent due to accumulated ore taken from the drifts or stopes previous to the burning of the Chinese quarters. The number of men now working there is far below the average.

Nevada.

WASHINGTON DISTRICT.—*Nevada Transcript*, Feb. 8: Mining at this place promises to be active this coming spring and summer. Fritz Meister and company, owners of the Allen and other ledges near the mouth of Canyon creek, now have a mill on the ground all ready to be erected, just as soon as lumber can be gotten in for the necessary buildings, flumes, etc. Donohoe and Stewart, owners of the Maryland ledge, farther down the river, have the finest prospect, as far as developed, of any so far found in the district. The first crushing of 14 tons paid over \$18 per ton, and there is plenty more of such ore left in sight. At the German mine, Supt. Cooley now has his main tunnel in over 450 feet. It has been a very expensive tunnel so far, as it has been in very hard rock the whole distance. After extending the tunnel a few feet further, it is Mr. Cooley's intention to raise up through to the upper tunnel, a distance of 128 feet, to connect with a large and rich chute of ore at that point, when stopping will be commenced, a mill built and other needed improvements made on the property.

A THREE DOLLAR DIVIDEND.—*Grass Valley Telegraph*, Feb. 3.—The Morning Star Gravel Mining Company will this month declare the largest dividend yet made by that company. The dividend will be \$3 a share on the capital stock and is divided No. 16. The Morning Star is now looking better than it has ever looked and there is a hoist of gravel 14 feet high and 300 feet wide now in sight. The dividend will probably be declared this evening.

THE SEVEN-THIRTY MINE.—*Grass Valley Tidings*, Feb. 5.—Within the last few days the lessees of the Seven-Thirty mine at Deadman's Flat have placed in the keeping of the Citizens Bank of Grass Valley a quantity of ore too rich to be otherwise disposed of, pending reduction. The gold is coarse and wiry, and much of the ore is of a rich specimen grade. The quartz abounds in iron carrying gold. The ledge is ten inches in width at the point where the rich ore is being extracted. The lessees are confident that they are on the edge of a "hunch" such as that from which they extracted in the neighborhood of \$10,000 a year ago. McLachlan & Co's bond of the property expires March 1st, and the owners will not renew it. The bond price is \$7,000, of which almost \$1,000 has been paid.

In view of the developments already made, and the developments in the California mine, separated only by one claim and in which direction the rich shoot of ore runs, Seven-Thirty stock must be regarded as a good buy.

Placer.

WHERE THE TUNNEL IS TOO HIGH.—*Placer Herald*, Feb. 9.—In running a tunnel to tap the main channel in the Dardanelles gravel mine, near Forest Hill, it was found that it was too high. The tunnel at a distance of 2,600 feet struck the rim of the channel. Ordinarily the remedy in such cases is to go back and drive another tunnel on a lower level, which is very expensive and which only a very rich prospect will warrant. In this case, however, the difficulty has been overcome by a cheaper method and one which will interest mining men as something new in the plan of mining development. In the first place an endless three-quarter inch steel cable was put in the full length of the tunnel. It is run by a two-foot Hurdy wheel at the tunnel's mouth. This cable is made to carry the cars in and out and at the extreme end of the tunnel, 2,600 feet from the mouth, it runs over a 9-foot wheel, and this wheel in turn affords power for hoisting the cars up the side of the channel which has an incline of about one foot in three, and runs a pump that keeps the lower levels of the mine free from water. Should this plan prove successful, and so far as tried it works admirably, it will prove a boon to many miners who, find, after expending thousands of dollars, that their tunnel is too high.

YIELD FROM THE WASTE DUMP.—*Placer Herald*, Feb. 6: Thos. Manahan and Benj. Hawkins, of Ophir, obtained from the Eclipse mine owners the privilege of working over their waste dump, agreeing to pay for the same 20 per cent of all they might make. In about a week's work they culled out ten tons of ore which they had crushed at the old Lavalie mill, and which yielded them \$600, or at the rate of \$60 a ton. They are now at work sorting out another crushing. This yield is large, and when we consider it is taken from the waste dump, it is astonishing. On the Eclipse mine is a good mill and good hoisting works, and yet the company that erected them was closed out presumably because the mine did not pay. Their successors, after taking out about 200 tons of ore, which ore is not yet crushed, have also closed down. These hitches in the mine's operations have impressed the public with the idea that the mine is poor property, but if we may judge from the yield of the waste dump, the fault in the past has existed more in the management than in the mine.

Plumas.

BROOKS CLAIM.—*Plumas Bulletin*, Feb. 4: From A. D. Hallstead, who was in Quincy Sunday from Twelve-Mile Bar, we learn that five men are at work on the Brooks claim, under the management of Henry Patten. The property is owned by Wm. Duncan, of Oroville, and it has been in operation all winter. The claim is said to be good. The Hallstead Bros. are driving a tunnel to crosscut a chimney of ore developed above. They think they are now on the end of the chimney. This tunnel will tap the vein 120 feet deep. Cap. Corser, Fred Lewis and Francis Jackson will all begin mining as soon as the spring opens.

GREENVILLE.—*Cor. Plumas National*, Feb. 9: The Green Mountain mine, under the able management of G. P. Cornell, is being pushed to a successful opening in the near future. The No. 6 tunnel nearly cleaned out, and milling of ore and development work will soon be prosecuted. Mr. Whitney, Supt. of the Crescent mine, informs me that the pumps are already running, and the work of rebuilding the hoisting works, which were destroyed by fire Jan. 20th, will be pushed as fast as men and material will permit.

Sierra.

SIERRA CITY.—*Mt. Messenger*, Feb. 6: T. Berger was down from Sierra City Tuesday, and said that he has seven men pushing his lower tunnel (10 near a thousand feet) ahead rather slowly through hard bedrock. There is good paying quartz in the upper tunnel.

GIBSONVILLE.—Latest advices from Gibsonville are that there is an abundance of rich gravel at Thistle Shaft. Fifty men are working there and the force will be largely increased soon, as water is more abundant. The proposed 500 feet of tunnel, from Wallis Creek to Thistle Shaft, is considered one of the sure events in the future of this old-time mining camp.

Siskiyou.

MTLL.—*Yreka Journal*, Feb. 4: Clarence Davis and Arthur Scheld have just completed a fine little four-stamp quartz mill for prospecting their quartz ledges on Long Gulch and Greenhorn, and are now getting the engine in readiness at the Y. R. R. Co's round house. The engine is the one formerly used by Nick York in running his steam circular saw in cutting cordwood, and the boiler was given them by Chas. Kapler, of the Etna brewery. The cams or arms for raising the stamps were made by J. W. Scheld, the well-known blacksmith of the Scheld family, who is quite a genius also in the machinist line. Davis & Scheld intend setting up the mill on Long Gulch, where they have some fine looking quartz ledges, and are also interested in ledges on same gulch, discovered by W. W. Davis and Jas. Manning. If these ledges should prove extensive and valuable, a large mill will be built, to work them on a more extensive scale.

COAL.—Work in the Siskiyou Coal Mine at Willow creek, about nine miles north of Yreka, has been suspended until the company obtains a heavier steam engine, as the one now in use is too light to handle the increased amount of water and haul up the coal at the same time. The coal realized since getting down to the main bed is of excellent quality, and when the mine is worked with machinery of sufficient power a great quantity of coal can be taken out to supply the entire market in this county, besides shipping to other sections.

HYDRAULIC AND PLACER.—The hydraulic and placer miners have not been able to do much mining the past week, owing to cold weather preventing the snow from melting to furnish water, but as soon as we have warm weather and rain we may look for lively times in all the camps until a later period than for several years past. The mountains now contain a vast quantity of snow, which has become hardened so as to melt slowly for greater benefit, as the soft snow sluiced off soon after falling seldom affords any great benefit, owing to the large surplus of water going to waste. Work will probably be commenced about the first of next month in the McConnell claim at Klamath river, which has been leased by a Chinese company. They intend working at

the old place, where they took out considerable gold two years ago, the place worked last year not paying well.

Tuolumne.

RAWHIDE GROUP.—*Tuolumne Independent*, Feb. 6: The Rawhide group of mines are situated to the north of Table mountain, Tuolumne county, on the mother lode of California. This section is a most promising one, and may be safely considered to be one of the best and most highly auriferous portions on the mother lode in Tuolumne county. It is less broken, and more generally defined, and has other advantages, viz: Water power and the electrical utilization of water power. The necessary electrical power can be obtained down in Mormon creek by the proper works being established in that locality. Water can be brought there to generate sufficient electrical power to run the machinery for all the mines in this group, either by one company or by the various interests joining together for the common good, thus dividing up the expense of the plant and transmitting the motive power by wires for hoisting and mills, as well as lighting the same.

Yuba.

MAY HYDRAULIC A LITTLE BIT.—*Grass Valley Union*, Feb. 7: The drift mining machinery on the Blue Point gravel mine at Smartsville has been partially covered up by a slide, and the Yuba county Supervisors have consented that the injunction against working the ground by hydraulic process shall be so far modified as to enable the owner, Patrick Campbell, to work away the gravel to rescue the machinery, provided that the time shall not extend beyond 30 days. This has been the first concession that has ever been made to Campbell, although he has been a heavy loser by the injunctions against hydraulic mining.

NEVADA.

Washoe District.

ALTA.—*Virginia Enterprise*, Feb. 7: We have the double rods in place up to a point in the shaft 680 feet from the surface. As the rods must be fitted in the open air, the stormy weather is against us to some extent.

OPHRA.—There has been raised to the surface during the week 27 tons of ore, the average assay value of which is \$22.10 per ton. Have continued the work of repairing and retimbering the main south drift on this level.

MEXICAN.—On the 1465 level the crosscut started west from the bottom of the winze sunk 101 feet down from the end of the crosscut run west from the main north lateral drift near the south boundary line of the mine, has been advanced 25 feet; total length, 43 feet; face in porphyry showing fine lines of quartz.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. south lateral drift from the main west drift, at a point 1570 feet in, has been extended during the week 33 feet; total length, southward, 135 feet; face in porphyry and clay. Have resumed work in the joint west drift on this level.

CON. CALIFORNIA & VIRGINIA.—1100 level.—The upraise which was started at the mouth of the west crosscut No. 3, started from the main south drift, 310 feet south from the shaft station, has been carried up 25 feet; total height, 35 feet in a porphyry formation. A north lateral drift started at the shaft station has been advanced 40 feet in porphyry showing streaks of quartz. 1650 level.—Have continued to extract ore of fair quality from the drift run west from the top of the upraise carried up 50 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from winze No. 3, 72 feet down, in working upward from that point. From the north end of the California ground on the west side are working in the old stopes and extracting therefrom some ore of fair quality. 1750 level.—In working out and upward from the bottom of winze No. 2, sunk from the 1650 level, we continue to extract ore of fair quality. Have also extracted some milling ore at the point where the upraise carried up from the crosscut run west from the southwest drift made connection with the stopes on the eighth floor. Have continued to extract ore of average quality at the point where the upraise from the southwest drift, 70 feet north from the south line of the California ground, connected with the eighth-floor stopes. 1800.—Along the south end of the drift running south from the crosscut run east from the winze (No. 1) sunk from the 1750 level, we have continued to stoep out ore from the sill floor upward to the height of 28 feet, in ore of mining value. There has been extracted from all parts of the mine during the week 1037 500-2000 tons of ore, which was shipped to the Morgan mill. The average assay value of all the ore worked at that mill during the week (980 tons) was \$32.95. Bullion shipped to Carson mint, assay value, \$26,637.74.

GOULD & CURRY.—350 level.—West crosscut No. 1, from top of upraise No. 2 from 400 level, has been extended 19 feet through soft porphyry and stringers of quartz; total, 50 feet. East crosscut No. 1, opposite west crosscut, was advanced 14 feet; total length, 35 feet; face in porphyry and quartz. On the Suro tunnel level the joint north drift with the Savage is advanced 147 feet; face in porphyry. BEST & BELCHER.—900 level.—West crosscut No. 1, 100 feet north of upraise from 1000 level, has been advanced 24 feet through soft porphyry and stringers of quartz; total length, 54 feet.

Tuscarora District.

NORTH COMMONWEALTH.—*Times-Review*, Feb. 5: Second level.—Stopes going east from winze have improved, showing more high grade ore. Extracted 28 cars of ore, assay, car sample, \$43 per ton. West drift from No. 1 crosscut extended 19 feet in vein formation. No. 1 raise from west crosscut extended up 26 feet, encountered incline vein, 18 inches, giving low assays.

NEVADA QUEEN.—Fourth level.—South intermediate drift extended 10 feet in porphyry. The raise has been timbered up to second level and track put down to run to No. 2 chute, 180 feet. West crosscut raise in the vein extended nine feet, looking more favorable.

DEL MONTE.—Second level.—Stopes are looking well and will be connected with raise by the 6th, exposing good ore all the way. Extracted 12 cars first-class ore, assays \$275 per ton, and 26 cars second-class, assays \$45 per ton. East drift from No. 4 joint raise advanced 21 feet.

NAVAYO.—South intermediate below the 350 foot level extended three feet, the vein is small but rich,

East intermediate drift extended 11 feet and connected with the main workings.

BELLE ISLE.—No. 1 winze below the 350 foot level No. 3 vein, extended 41 feet, the vein is showing eight inches of first-class ore. The crosscut from No. 1 vein has been extended 12 feet, rock getting harder. The winze from the 250 foot level extended 12 feet, showing some good ore.

NORTH BELLE ISLE.—No. 3 north drift, 400 foot level, extended 13 feet. North intermediate above the 400 foot level, No. 2 vein, extended nine feet, showing some good ore. South intermediate above the 400, No. 1 vein, extended eight feet, showing 10 inches of good ore. South 500 foot level extended 14 feet, rock getting harder. The first-class ore is left stored under ground, pending the starting of the sampling works, to save extra-hauling. Hoisted 22 cars of second-class ore, estimated assay value \$30 per ton.

Pioche District.

FURNACE NOTES.—*Pioche Record*, Feb. 6: Furnace No. 2 has been thoroughly repaired and resumed operations. The present receipt of ore from the company's mines speaks well for the future yield. One furnace is kept going steadily and the bullion produced has an upward tendency in value. The reading room is well patronized by the men and affords them many hours of rational enjoyment. All the dwelling houses connected with the works are being painted, adding much to the appearance of the works. The governor connected with the main engine is undergoing repairs. It does not interfere with steady running of the machinery. The ore bins are rapidly assuming their usual quota of ore, and the late spell of good weather has caused ore to come in more rapidly. The round house is now completed and ready for occupancy by the iron horses. It presents quite a feature amidst the rest of the works. The scales from the old works have been removed to the new works, as those at present in use were found too light for weighing the heavy flat cars. The night train has been suspended for the present and the bands laid off, as it was found one shift was capable of bringing in the ore as fast as excavated.

ARIZONA.

Mohave Co. Miner, Feb. 6.—Charles Sherman and Ed. Thompson returned from their trip to the Chimabue mountains and report everything in that camp looking well. Several tons of high grade silver ore was shipped from the C. O. D. mine to the sampler this week. The ore was taken from a winze on the 150 level. Clack Bros. have considerable ore in sight in the part of the C. O. D. mine held by them under lease. All dead work has been done and hereafter they will devote their attention to taking out ore. Thomas McMahon and Thomas Burke have a carload of high-grade ore on the dump of the Prince George mine. Their showing in the stopes is looking fine and they will probably get several carloads more from the lynch. E. Eherman, one of the heavy stockholders of the Flores Mining Company, has been looking over Weaver and Minnesota districts, and was so much pleased with the latter district that he invested in some of its mining claims. A carload of ore arrived from the Berkley mine a few days ago and was run through the sampler, giving a good result in silver. A number of men are at work in the stopes and regular shipments of ore will soon follow weekly.

CEDAR VALLEY.—W. R. Judson, Supt. of the Arnold mine, went down to Cedar Valley this week. It is understood that the hoisting machinery will arrive in Hackberry in a few days and that it will be taken to the mine as soon as possible. A number of men have been employed for some time past in repairing the road from the Sandy to the mine over which the machinery will have to be hauled. Geo. M. Bowers and O. D. M. Gaddis have purchased a one-half interest in the mining claims held by White and Rucker in Minnesota mining district. E. Eherman has secured one-half of Messrs. Bowers and Gaddis' interest in the above-named district and will commence developing the best looking prospects immediately. One of the claims is a very promising property, showing free gold all through the ledge. William Rumpf came in from the new gold strike in the Chimabue mountain Tuesday evening. He says that the gold discovery of Brawn & Co. is panning out well. A shaft has been started on a three-foot ledge showing up well in coarse free gold. At the mine of Hutt and Hite work is progressing nicely and large quantities of ore are being put on the dump.

DAKOTA.

CONCENTRATES.—*Deadwood Pioneer*, Feb. 4: Work on the Uncle Sam and Bellevue tin mines at Nigger Head is being prosecuted and fine samples of the ores were on exhibition yesterday. Mr. John Treher and Tius Molitor are the principal owners and have a property second to none in the Hills. A few pounds of the ore was pounded up in a mortar and a fine bar of tin run out. It is estimated that the ore body now in sight will run about six per cent of metallic tin. A fine sample of ore from the Bullion mine of Galena is on exhibition at the office of John Biggaley. We understand that Sam Ranbauser of Central City has taken the contract to transport the machinery for the stamp mill to be erected at Mineral Hill, in Bear Gulch and that the mill is expected to be in operation by the first of May. The parties interested in this enterprise are men of means and experience and are well satisfied of the success of their undertaking, which necessitates the outlay of many thousand dollars.

NEW MEXICO.

ORE SHIPPED.—*Western Liberal*, Feb. 7: Holmig Brothers and Freidewald shipped a car of ore to El Paso this week from their mines at Granite Gap, which they located the first of January. A hand sample of eight tons assayed 47 per cent lead and 36 ounces of silver.

NEW DISCOVERY.—The *Liberal* was out this week to the new discovery of ore which is being worked by L. B. Durnill and John Miller. Miller was staked by Durnill some months ago and went to prospecting in the neighborhood of Lee's peak. He found a place there where work had been done in previous years and then abandoned. He prospected the place thoroughly and was rewarded by finding considerable horn silver, and so went to

work sinking on the ledge. He was rewarded by finding some very rich ore. He is now down some 40 feet and has a ledge about three feet wide with a pay streak of ten inches. The pay streak runs 200 ounces in silver, there have been numerous assays of it, some of which have run way up beyond this and none have gone any lower. Numerous assays of the rest of the ledge shows that it runs about 50 ounces of silver, but this is too low to pay to ship. Parallel with this ledge and about 40 feet from it, on the same location is another one. The extension of this ledge west is located by Presly Johnson, and it is the location known as the Maxfield claim, which was located, worked and abandoned by Lew Maxfield five years ago.

IDAHO.

TRADE DOLLAR.—Idaho *Avalanche*, Feb. 3.—Work has continued to be vigorously pushed at several points upon the Trade Dollar property. Tunnels number one and three are both being driven ahead and stoping is being done in number two. The Blaine tunnel is being widened for a double track at the rate of about fourteen feet per day, and the breast will be reached in another fortnight, when two air drills will be employed to continue it. Another air drill will be employed in crosscutting the country west from this tunnel to prospect the ground for other ledges showing up on the surface. The ore showing in the slope in number two tunnel is high grade with several inches of rich shipping ore.

LOWER CALIFORNIA.

ALAMO.—*Lower Californian*, Feb. 2: The Aurora company is expecting its new electric drill and equipment, and is building a house for its reception. Some talk is made of sinking a new shaft some meters up the hill from the present shaft so as to get a perpendicular shaft to a great depth, the present one making an angle at quite a depth down. The mill runs steadily daily as many hours as water will permit.

The Princess has found an entirely new ledge in the crosscut at the 200-foot level. This makes three ledges known to exist in Princessa grounds. Several locations have been made in the vicinity of these mines, as it is now definitely understood that more capital is soon to come in to explore the camp. The Princessa company has located the Princessa No. 2, lying north of the present mine, so as to hold its mill site and dumps, etc.

MONTANA.

PANORA.—*Butte Miner*, Feb. 4.—During the week an 18-inch streak of 140-ounce ore was struck in the face of the bottom level of the Pandora mine, near Soap gulch. The shaft is now 200 feet deep, and indications at this depth point to a bright future for this property. From ore already extracted two dividends have been paid, but during the coming two months the proceeds realized from the sale of ore will be used in defraying the expenses of erecting a five-stamp mill at the mine. A car-load of 73-ounce ore was shipped to the Silver Bow sampling works in this city a few days ago, and another shipment is now being prepared.

DEVELOPING A BONANZA.—Among the properties in the vicinity of Meaderville that will soon become well known by reason of its productiveness is the Mountain Chief, owned by Dave Upton and others. The property is one of the oldest in the camp, having been worked to good advantage in the days when the product had to be hauled in wagons 400 miles to railroad and thence shipped East for treatment, and situated in the heart of the copper-silver belt. About five years ago it worked under lease and yielded for the lessees considerable money. It is now being worked by Messrs. Eugene Sullivan, W. Murphy and Charles Nuss, who are sinking the shaft from a former depth of 400 feet to the 500-foot mark. The mine is equipped with first-class hoisting and pumping machinery.

AT THE MOOSE.—Work at the Moose, owned by the Boston and Montana Company and located East of Walkerville, is confined to one shift of about thirty men. Operations are being carried on at the three-hundred-foot level, from which considerable ore is being extracted. Lately some very rich specimens of ore have been taken from the vein, some of which were literally filled with native and wire silver.

STRIKING IT IN A WELL.—As an illustration of the manner in which ore bodies are frequently discovered in Butte, it may be stated that a strike of a foot and a half vein was made in a well near the Northern Pacific depot Saturday afternoon. The well is being sunk by E. H. Sherman just in the rear of his warehouse. The vein was struck at a depth of 20 feet, and assays from the ore made shortly after discovery gave it a value of \$57 in silver and \$20 in gold. After the strike was made known several parties endeavored to procure a lease on the ground, but were unsuccessful.

AT THE MOODOC.—The Modoc, one of the Anaconda Company's copper properties, located west of Meaderville, is again in operation with a full complement of men. The property is yielding about 400 tons per day, the larger portion of which is being taken from the west working of the four-hundred-foot level. The Modoc is considered one of the banner mines of the company and will, with greater depth, prove as a great producer as some of the large ones. The working force consists of about 60 men.

AN ADDITIONAL FURNACE.—With a view to increasing the output of the plant the Butte and Boston Company is adding to its smelter another blast furnace of 100 tons capacity. The work is almost complete, and within two weeks more the furnace will be in operation. The entire plant of the company is in full blast with a corps of 450 men, which, with the crew at the mines, swells the total to nearly 400.

OREGON.

OUR GOLDEN HILLSIDES.—Grant's Pass *Courier*, Feb. 4: John Hall and Isaac Van Dorn struck a fine ledge of point on Picket creek, about eight miles from this city, in their prospecting tour last week. In the same neighborhood a rich ledge of quartz was also found, and Mr. Hall exhibited some pretty specimens of free gold taken from the base of the point ledge. He has been in Josephine county for 16 years and like all our old settlers he is strong

to the opinion that there is lots of gold yet undiscovered in our hills. Heretofore the prospecting has been done along creek bottoms, but of late the hillsides have been found rich in placers. The gold has lodged in pockets on the hills, having washed down during long ages from the golden ledges above. Josephine county will soon be known as the richest diggings for both quartz and placers on the coast.

UTAH.

STRIKES.—*Park Record*, Feb. 6: It is rumored on the streets this week that the Lucky Bill shaft was close to a large body of good ore, so close, in fact, that while cutting a station on the 300 level the ore was uncovered. The ledge was at once crosscut, and shows up big and strong with a large streak of pay ore. Superintendent Burton at once brought some of it down and took it to Salt Lake, where an informal meeting of the directors was held. At this meeting it was decided that the shaft should be continued until it intersects the vein in its regular dip, which will be within the next 50 feet, according to the estimate of Supt. Burton. The ore is a combination of chloride and carbonates, and will undoubtedly run high in silver. The Lucky Bill is now making preparations to put in a hoisting engine early in the spring, as the shaft is getting to be of such depth that hoisting with a whim is slow and tedious work.

THE SILVER KING A MINE.—With a tenacity seldom equaled by men of limited means, David Keith and associates, who have a lease and bond on the Silver King mine, have worked away at the shaft started in that property by John Farish and others until it has reached a depth of some 800 feet, intersected the vein and become a mine in the fullest sense of the word. New machinery has been purchased from time to time as the shaft obtained depth, until now the property is well equipped and capable of hoisting a large quantity of ore. The ore-house being constructed by the Silver King people is fast approaching completion, and will be one of the best in the camp. The vein has opened good and strong, and ore extraction has commenced in earnest.

CAMP CROSSCUTS.—The improvements inaugurated at the Anchor concentrator were all completed this week, and the mill started up last night. Everything works smoothly so far, and no trouble is anticipated. Connection was made last week between the long drift from the 200-level of the Woodside shaft and the old workings, and the mine now has much better air. Charles Barnicott has put a force of men at work and will sink a shaft on the indications for coal he has recently uncovered on his claims below town. The possibilities of coal that near to Park City has a tendency to interest everybody in the camp, and should the croppings found lead to coal, it will be better than a silver mine to Mr. Barnicott. The men he has working are old Pennsylvania coal miners and they are working for an interest in the ground.

Obituary.

John J. Williams, a prominent member of the firm of Bisbee, Williams & Co. of this city, died at San Diego on the 16th ult. in the 47th year of his age.

Mr. Williams was born at Swansea, Wales, where he received his early training in the Vivian Smelting Works, and had the advantage of instruction from his father, John Williams, who in his day was one of the best authorities in this country in matters pertaining to the mining and reduction of metals.

In the death of Mr. Williams, the mining interests of this coast suffer a great loss and his family loses a kind and loving husband, father and brother.

For many years Mr. Williams was identified prominently in the development of the copper mines of Arizona, and under his direction the Old Globe copper mines of Arizona were developed and placed upon a paying basis. Lately, he has been in the employment of Messrs. Phelps, Dodge & Co. of New York looking after their interests in Arizona.

He was a brother of Lewis and Ben Williams, who have so successfully conducted the mines and smelting works of the Copper Queen Con. Copper Mining Co. at Bisbee, Arizona, since 1881.

His many friends deplore his death, and desire to express to his bereaved wife and family their heartfelt sympathy in this the saddest hours of their lives.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

TOMASSO HILL M. CO., Jan. 2. Location, Mexico. Capital stock, \$1,000,000. Directors—A. H. Butler, E. A. Brannan, C. H. Haley, H. N. Gray and J. B. Lewis.

WILLIAMS HARDWARE CO., Jan. 3. Capital stock, \$50,000. Directors—S. G. Williams Sr., E. W. Williams, S. G. Williams Jr., H. S. Warner and S. C. Walls.

Eastern Metal Markets.

New York, Feb. 10.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper	Lead	Tin
Thursday.....	412	9 1/4	10 7/8	4 2/8	19 60
Friday.....	412	9 1/4	10 7/8	4 1/8	19 60
Saturday.....	412	9 1/4	10 7/8	4 1/8	19 60
Sunday.....	412	9 1/4	10 7/8	4 1/8	19 60
Tuesday.....	412	9 1/4	10 7/8	4 1/8	19 60
Wednesday.....	412	9 1/4	10 7/8	4 1/8	19 60

The metal market continues essentially unchanged, but the opinion still prevails that a revival in business is near at hand. Borax, quicksilver, tin and copper do not show any material change.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING FEB. 2, 1892.

- 468,144.—THIMBLE, ETC., FOR BARRELS—Anthony & Savage, Oakland, Cal.
468,291.—PILE ARMOR OR CASINO—Bedbury & Badgley, S. F.
467,968.—ANTI-FRICTION AXLE BOX—E. M. Bridwell, McMinville, Or.
468,069.—GRAIN CLEANER ATTACHMENT—Henry Bryan, Modesto, Cal.
468,218.—DOOR SECURER—C. F. Caldwell, Bridal Veil, Or.
467,917.—TELEPHONE HOLDER—J. A. Christy, S. F.
468,134.—GRAVEL SCREEN—F. T. Gilbert, Walla Walla, Wash.
468,197.—GRAVEL SCREEN—F. T. Gilbert, Walla Walla, Wash.
468,063.—AMALGAMATING SILVER ORES—Alexis Janin, S. F.
468,303.—BAND SAWMILL—C. J. Koefoed, S. F.
468,036.—HOLDER FOR BRUSHES, ETC.—W. F. Loan, Portland, Or.
468,064.—CABLE GRIP ADJUSTER—H. H. Lynch, S. F.
468,029.—VALVE—D. R. McKim, Gold Hill, Nev.
468,205.—SLING CINCIN—D. O'Sullivan, Spokane Falls, Wash.
468,206.—RIFLE SIGHT—R. W. Parker, Camp Huachuca, A. T.
468,208.—AERIAL TRAMWAY—Prunetti & Avignone, Sierra City, Cal.
468,066.—SEPARATOR—F. H. Wheelan, Santa Barbara, Cal.
468,067.—BALL-BEARING—H. G. Yates, S. F.

The following brief list by telegraph, for Feb. 9, will appear more complete on receipt of mail advices:

Frank A. Fox, San Francisco, car coupling; Frank A. Huntington, San Francisco, crushing mill; Edward M. Knight, San Francisco, filter; Thomas Powell, Stockton, wheel pump; Johnathan M. Robinson, Vacaville, propelling vessels; Anderson & Fairchild, S. F., adjusting device for cable grips.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

BALL-BEARING.—Henry G. Yates, S. F., assignor to the Universal Ball-Bearing Wheel Co., S. F. No. 468,067. Dated Feb. 2, 1892. In ball-bearings, as usually constructed, one or more rows of balls are fitted to travel in a groove or grooves formed upon the axle or a collar which is fixed to the axle and enclosed in an exterior casing similarly grooved, so that the outer peripheries of the balls run in contact with the interior wall of the casing. The weight of the moving part is thus carried upon the balls which are at that time passing between the surfaces, which are forced toward each other by the weight, and as soon as they have passed this point others take their place, and the remainder of the balls traveling around in a circle are comparatively free from the weight, so that, although turning in opposite directions, there is comparatively little friction between their rubbing surfaces. In this invention of Mr. Yates', he has shown a hub carrying a wheel or pulley and turning about a shaft which is of smaller diameter than the bore of the hub. Semicylindrical grooves are made in the ends of the hub and the balls are retained between the grooves in the hub ends and corresponding grooves in collars which fit the axle and abut against the hub ends, so that when properly adjusted the hub is carried upon the balls out of contact with the axle, and is practically supported upon all points within the collars instead of at a single point, as in the ordinary construction.

SEPARATOR.—Fairfax H. Wheelan, Santa Barbara. No. 468,067. Dated Feb. 2, 1892. This invention relates to the separation of foreign articles from grains, seeds, etc. The general object of the invention is to separate the smoother from the rougher particles of any material which is composed of particles of different degrees of smoothness, and its special object is to separate the dirt and other foreign particles from grains, and particularly from leguminous seeds. The invention consists in feeding material composed of particles of different degrees of smoothness, upon a rotating surface, on which said particles are subjected to centrifugal action, which produces a separation of those particles having a less coefficient of friction with the surface, from those particles having a greater coefficient of friction therewith. The invention also consists, in connection with the above, of guiding the material to such a point on the surface where the centrifugal force can act to effect the separation of the smoother from the rougher particles, then relieving the particles to permit their separation, and then catching the separated particles at different points on the surface and maintaining their separation.

CABLE GRIP ADJUSTING DEVICE.—Henry H. Lynch, S. F. No. 468,064. Dated Feb. 2, 1892. This device for adjusting cable grips consists of a take-up mechanism applied to the grip-lever and its connection with the stationary frame, whereby the wear of the gripping dies may be compensated, and the arc over which the lever is moved to open and close the grip, remains substantially the same at all times. By the

construction covered by the patent, it is rendered easy for the gripman to adjust the parts to the constant wear of the gripping dies and without stopping or taking his attention off his business.

GRAIN CLEANER ATTACHMENT.—Henry Bryan, Modesto, Stanislaus Co. No. 468,069. Dated Feb. 2, 1892. This attachment for grain cleaners is especially adapted for use upon traveling harvesters, and is useful in properly distributing grain and chaff from the sides toward the center of the cleaning shoe when the machine is working upon sidehills.

FLASH-LIGHT BURNER.—Sylvester M. Williams, S. F. No. 467,936. Dated Jan. 26, 1892. This invention relates to that class of burners for igniting magnesium and other flash-light powders for use in producing artificial light for photographic purposes. The object of this invention is to provide a flash-light burner simple in construction and operation, of great capacity, and which can be used in daylight as well as in darkness.

Mining Share Market.

SAN FRANCISCO, Feb. 11, 1892. Mining shares the past week were quite active, but "spotted." Hale and Norcross is the last stock to develop life and make one of those quick up-moves which have been a characteristic feature of the market. It now looks as if the "brokers' combo" is forcing inside stock pools and mill rings into the market so as to buy stock to keep control of the mines marked for hoisting.

The quiet but vigorous working work that has been under way in the Hale and Norcross mine for three years past has made it possible to extract the rich ore to the west at a nominal cost, which doubtless is contemplated to be done by the rings if they retain control in such a way that outside shareholders or reports to the public will be kept from getting the bullion. It looks now as if the little game had been thwarted by the developments in the suit against the Hale and Norcross directors, throwing into the speculative arena a brokers' combination calculated to make the rings buy stock to keep control of the mines, and not retain it as heretofore by the pernicious proxy system.

It is reported in well-informed circles that the present management of Hale and Norcross, realizing they cannot control enough stock to carry the election next month, has made advantageous terms with J. L. Flood to get control and put in office persons of his choice. Be this as it may, it is a well-credited fact that Mr. Flood's brokers are picking up all the stock they can.

Manuel Elyre, in his suit against directors in several of the Comstock mines, has been allowed to do to amend his complaint to conform to the rulings or decision of the Supreme Court, reversing Judge Hunt's decision in favor of the defendants. The following are the directors sued for not having the mine superintendent make out his weekly statement or report to the directors, the latter of which the companies are incorporated: Fry, Harmon, Hayes, Hirschfeld, Levy, Lylic, Shackelford, Scott, and Marks. The case comes up before Judge Garver, in Department 1.

News from the Comstock mines continues very encouraging, with reports of improvements in two of the Middle mines, with three of the Gold Hill mines looking more favorable. In the North Star, the news continues of favorable character. The battery assays of Con. Virginia, Savage and Hale & Norcross show a steady gain.

From the outside mines our advices do not report any change in the situation in either the Quijota or Tuscarora districts. From the Bodie district the news grows more important. The mill is kept fully supplied, and the reserve in the main ore chute in the mine, which will hold over 200 tons, is being daily added to. Over 700 tons of high-grade ore have already been extracted from this bonanza.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 21.	WEEK ENDING Jan. 28.	WEEK ENDING Feb. 4.	WEEK ENDING Feb. 11.
Alpha.....	45	55	60	50
Andes.....	50	55	60	45
Belcher.....	1.50	2.40	1.60	1.60
Belle Isle.....	25	20	30	30
Bodie.....	1.15	1.60	1.50	1.20
Bullion.....	55	55	60	75
Bulwer.....	45	50	40	55
Commonwealth.....	20	25	25	20
Con. Va. & Oat.....	3.70	4.50	4.65	5.00
Challenge.....	55	1.00	1.00	80
Chollar.....	90	1.00	1.25	1.50
Confidence.....	2.70	2.95	3.75	2.60
Copa Va. & Oat.....	10	10	10	10
Caledonia.....	30	40	35	30
Crow Point.....	1.25	1.60	1.55	1.40
Crocker.....	05	15	20	10
De Mont.....	45	50	60	75
Eureka Con.....	1.50	40	2.00	40
Excelsior.....	35	45	50	30
Grand Prize.....	1.05	1.15	1.15	1.40
Gould & Curry.....	80	1.20	1.60	2.00
Hale & Norcross.....	10	15	15	15
Julia.....	20	30	30	55
Justice.....	20	30	30	20
Kentuck.....	15	20	20	20
Lady Wash.....	70	85	60	75
Mexican.....	1.50	1.90	2.20	1.75
Navajo.....	10	10	10	10
North Belle Isle.....	30	30	35	15
Ner. Queen.....	35	40	45	35
Ophir.....	2.65	3.30	3.50	3.25
Overman.....	1.00	1.15	1.20	1.10
Potosi.....	1.50	2.40	2.00	1.80
Peerless.....	15	20	10	10
Peer.....	25	20	15	10
Savage.....	1.30	1.65	1.85	1.50
S. B. & M.....	80	70	55	115
Silver Hill.....	1.60	1.80	1.55	1.75
Scorpion.....	20	25	30	25
Union Con.....	1.35	1.80	2.00	1.40
Union.....	35	50	60	40
Yellow Jacket.....	1.05	1.25	1.15	1.40

* Assessment added.

THE MINING AND SCIENTIFIC PRESS of Jan. 30th is a valuable number, and should be in the hands of every friend of the mining industry. Its report of the great Miners' Convention is complete, besides containing other valuable matter.—Georgetown (El Dorado Co.) Gazette.

MECHANICAL PROGRESS.

A Sensational Metallurgical Announcement.

Quite a sensational announcement comes to us from Germany, to the effect that recent experiments of several experts in Westphalia have resulted in the discovery of quite a new process in the production of pig iron from the ore, which bids fair to revolutionize the iron industry of the world.

The application of the electric current in separating iron from its ores has long been known, experimentally, if not practically. But this new announcement consists in the application of the electric current simultaneously with the use of a cheap and easily made acid in such separation. It is said that the experiments were confined to the raw material forming the blast furnace charge, and are said to have proved completely successful, the separation of all metallic substances being rapidly and perfectly effected, and the iron left in an absolutely pure condition. The process is stated to be 80 per cent cheaper than the present blast furnace method.

We have condensed the above from *London Iron*, which journal in its next subsequent issue gives the following:

We are enabled to present our readers with a few further particulars of the electro-metallurgical process, which, according to the German experts who have tested the method, is to revolutionize the metal industry. The announcement of what is claimed to be an epoch-making discovery, is naturally exciting great interest in metallurgical circles on the continent. The *Düsseldorf Zeitung*, which is on ordinary occasions a most reliable journal, is the print which first gave publicity to the sensational news, which it appears emanated from its Berlin correspondent, and this paper has now published a further long article, in which it further refers to the incredulity with which its previous statement has in many quarters been received, and remarks that doubts will in due time be dispelled. After incidentally mentioning that since the publication of the first article it has been inundated with epistolary and telegraphic inquiries, the journal proceeds to state that not only iron, but also other metals, such as gold, silver, copper and aluminum, can be extracted from their ores by the new and infinitely cheaper method. When it is considered, it continues, that the current generated by a dynamo driven by a small gas or petroleum engine will be capable of extracting day for day more metal than the largest blast furnace is able to produce, some idea may be formed of the radical changes which are likely to be the result of the employment of the new process.

Collieries will, of course, be considerable sufferers, as blast furnaces consume a by no means inconsiderable percentage of coal in the course of a year. The invention, which is more rightly described as an electro-technical discovery, was perfected three months ago.

The inventor has succeeded in devising a practical process which has secured the ready support of a number of well-known American and German capitalists, who purpose forming a gigantic international syndicate. Works are to be erected in all metalliferous and metallurgical districts.

The report circulated to the effect that a company had been formed with a capital of \$11,000,000 is not quite correct; this, it appears, is the modest sum at which the inventor was disposed to part with his process, but he has now completed an arrangement by which the utilization of his patent is to be left to the above-mentioned syndicate, his services being retained in the capacity of technical manager.

The statement as to the saving of 80 per cent on the present blast furnace method is said to be no exaggeration. The name of the inventor and his capitalist supporters are to be made known to the world as soon as the letters patent have been granted. And here, the journal adds in conclusion, the matter must for the present rest.

Of course, until further particulars are received, this possibly sensational report must be regarded with a certain amount of suspicion. As above stated, the idea of producing pig iron by the aid of electricity is not altogether novel. Experiments in that direction and on a somewhat extensive scale were made some years ago at an iron

works establishment in Lorraine, but those experiments have been reported as a failure, notwithstanding much direct assistance was received from Mr. Edison, who was then on a visit to Europe. It was found that though the process worked quite well on a small scale, it proved impracticable in the larger attempt made as above.

Economy in Steam Use.

The time has passed when a Watt or Corliss engine, in steam-making economy, could step in and "make two blades of grass grow where but one grew before." Such strides of economy as were witnessed in the early days of steam production and steam-using, have fully passed away and the age of "small economies" is now upon us. The actual economies in the future will depend upon very small improvements in the steam boiler and in the steam engine. The saving of coal in the production of steam at the present day, and during the near future, will depend upon superior boiler construction, furnace arrangement and the manner of feeding the furnace. The latter will ever be an important consideration.

People, says a cotemporary, instead of straining after some new, ingeniously mysterious device which is to save one-quarter of their fuel bill, will be much surer of immediate results if they direct their attention to the saving which is entirely practicable by the use of devices and appliances already available. The proportion of plants which are run within ten per cent of the attainable efficiency is very small; yet see what ten per cent means upon the operation of a comparatively small plant.

Suppose one pound of coal evaporates eight pounds of water, which is better than the average practice; suppose a hundred horse power noncondensing engine uses 40 pounds of steam per horse power per hour. This would call for five pounds of coal per horse power per hour, 500 pounds per hour for the 100 horse, 5000 pounds, or two and one-half tons, per day of ten hours, 750 tons per year of 300 days, and \$3000 per year at \$4 per ton. The saving on this expenditure, with an increased efficiency of ten per cent, would be \$300, or one dollar for each working day.

This percentage of saving is more than attainable on a great majority of plants which are running to-day; and, as we said before, there will be a far greater aggregate saving from an easily attainable increase in the efficiency of the ordinary plant by the use of the "every-day" appliances already at hand than in any record-breaking increase in efficiency in a single plant, accomplished at the expense of the utmost refinement in design, execution and management, however interesting the latter accomplishment may be from an engineering point of view.

COMMERCIAL STEEL, says a contemporary, may be considered as an alloy of iron, and is made by different processes, all of which may be classified under one of three different heads: Process of decarbonization, process of cementation, and the direct process. The elements that compose steel are numerous, consisting chiefly of iron, carbon, manganese, phosphorus, sulphur, silicon, chromium, and many others of minor importance. Carbon is generally found between the limits of 0.2 and 2 per cent, and is either in a free or combined state. The other elements occur, in general, between the following maximum limits:

Manganese,	from 0 to 1.0 per cent.
Phosphorus,	from 0 to 0.1 per cent.
Sulphur,	from 0 to 0.2 per cent.
Silicon,	from 0 to 0.5 per cent.

The characteristics peculiar to steel are chiefly its tensile strength, its property of hardening when heated and suddenly cooled, and its capability of being forged. Its structure is granular, and, in general, the more the steel is worked the finer and more homogeneous its structure. A coarse granular structure is often found in steel made by some direct process from the ore which has been little worked. Steel belongs midway between wrought iron and cast iron, and these three grades of "the irons," as they are sometimes called, have no defined lines of distinction. In general, however, the cast irons will chill, the steels temper, while the wrought irons will not harden at all.

HEAVY RAILS.—The Boston and Albany will use a 95-pound steel rail. The heaviest rail now in ordinary use in this country is a 90-pound rail on the Reading and Manhattan Elevated. The Chignecto Ship-Railway uses a 100-pound rail, and 100-pound rails have been laid in the St. Clair tunnel.

HARVEIZED RAILS.—Since August, 1891, two rails have been lying in the track of the Delaware, Lackawanna and Western Rail-

road at Scranton, which have been treated by the Harvey cementation process, the idea being to have the top of the rail, which is exposed to wear, hard, while the balance of the rail remains soft and is not subject to danger from breakage. The railroad officials report that the Harveyized rails show less wear and flow of metal than other rails subjected to service under the same conditions.

FUEL BRIQUETTES.—A new idea in the manufacture of fuel briquettes is the use of charcoal instead of coal dust. At Fagersta, in Sweden, artificial fuel is now being manufactured out of a paste of charcoal and tar, which is made into slabs about 16 inches thick. These are dried in the air for several weeks, until the water in the tar has disappeared. It is said that these briquettes give as good results as the better grades of English coal for steam-raising purposes.

AN IMPROVED BRONZE.—German foundries are using an alloy of 70 per cent copper to 30 per cent manganese, as a valuable addition to brass or bronze. It is said to increase the tenacity and ductility of the metal if the proportion of three per cent of alloy only be added. An excess of manganese makes the bronze almost as hard as steel.

FOR CUTTING OVAL HOLES.—Machines for cutting oval holes for manholes and hand-holes have for some time been in use in English boiler shops. It is stated that a machine of this kind will cut holes in 20 minutes that would require a day's work by a competent man; a great saving in large shops.

SCIENTIFIC PROGRESS.

The Artificial Production of Rain.

Attempts at the production of artificial rain have been undertaken by many enthusiasts during the last 50 years, but thus far without any decided success. The name of Espy will be recalled by many as one who caused no little interest in this direction from 1840 to 1850. His theory was probably more philosophical than that of any of his successors. His proposition was to effect changes of currents in the atmosphere by means of large fires, producing ascending currents of heated air—the exact manner in which such phenomena are produced by nature. But nothing came of it.

Somewhere about 1859 or 1860, an officer in the French army conceived the idea that rain might be produced by the use of explosives. He had seen much service in Africa and visited France with the view of interesting the Academy of Sciences in Paris to aid him in making experiments, but that body declined to have anything to do with the project. The officer returned to his post somewhat dejected, but resolved to do what he could in demonstrating the value of his theory. Some experiments were made, but on a small scale, and without success. The officer became known as "The Rain Maker of Sahara." He died in 1870, or near that time. His name was Parceau.

The particulars in regard to the recent experiments of Prof. Dyrenforth in this direction, made in Texas, are familiar to our readers. The professor had all reasonable means and appliances which a liberal Government appropriation could furnish, with a selected staff of enthusiastic assistants; but the results seem to have been quite unsatisfactory to the public, although the participants and some of his friends claim partial success. There is no probability that the Government will take any further interest in the matter.

While the Texas experiments were in progress, another "rain maker" appeared in several of the Western States. His process was a secret, and many claimed for him great success. He operated in various localities and in several States, but the public in general gave no credence to his claims.

Within the past few weeks, Mr. O. H. Smith has, according to common report, been conducting a series of rain-producing experiments in this State. Mr. S. is a member of the "Interstate Artificial Rain Company," a corporation organized in Kansas last December. Branches have been in operation in Kansas, at Temple, Texas, and at Pixley in this State. He claims that the efforts to produce moisture have been eminently successful. He has certainly commenced operations in this State at a very favorable time for success, but it is the impression of the people at large that he will have to divide the causes of success with the presiding rain genius of the Pacific Coast, with the honors largely in favor of the latter.

The system of Mr. Smith differs materially from the Dyrenforth plan of discharging explosives. Five chemical compounds are administered as medicine to the atmosphere

by means of a machine, the *modus operandi* of which is secret, as is the entire process. The machine requires to be kept going day and night, and the inventor claims that the only condition causing failure is a thermometer below 40°.

The company claims to have engagements in advance covering the balance of the winter. Huron, in the San Joaquin valley, and Los Angeles are among the points to be visited in this State. Experiments will also be conducted in South Dakota, Eastern Oregon and Colorado.

PHYSIOLOGICAL UTILIZATION OF ELECTRIC CURRENTS.—It is known that continuous electric currents decompose substances placed in contact with the electrodes, the results of which may be new combinations and transformations more or less profound. Proceeding from this standpoint, Dr. Foveau de Courmelles described at a recent meeting of the Paris Academie des Sciences some experiments which appear of a nature capable of furnishing physiological and even therapeutic applications. Thus, if crystals of oxalate of lime be enveloped in a dialytic animal membrane and immersed in a saturated solution of carbonate of lithine, and a continuous electric current be passed, only the insoluble substances will be found externally. Further, if iodide of potassium be injected into the center of a greasy compound, and a continuous electric current be passed, the mass will gradually form itself into clots. We clip the above from a scientific journal, and would add in support of the supposed therapeutic value of electricity that it is well known to many practicing physicians that that agent exercises an important influence upon tumors, both benign and malignant—including cancers—whereby, when accompanied with other assistant treatment, such ailments or aggregations are removed from the system without the use of the knife or caustics.

THE COMING RIVAL IN VALUE OF GOLD. The increased demand for platinum for use as poles in electro-chemical batteries, for crucibles, etc., has raised the price of that metal to a point never before reached, its present value being nearly three-fourths that of gold. Three years ago platinum sold for about \$80 per pound. To-day it is worth double this price, and is eleven times dearer than silver. The metal, says an exchange, which is indispensable in the manufacture of numerous scientific instruments, is only found in small quantities, namely, in the form of platinum ore in Peru, Columbia and Brazil, and in small steel gray grains in the Ural mountains, in this State and in Borneo. The principal source of production is in the Urals. The yearly output has never amounted to more than four tons, and at present it does not exceed three tons. Should not new and more fructiferous deposits be discovered, and this is scarcely probable, platinum will soon be literally "worth its weight in gold."

ANOTHER "LARGEST" TELESCOPE.—Mr. H. C. Williams, editor of the *Millstone*, and an enthusiastic student in astronomy, is said to have contracted for "the largest telescope in the world," to be erected at the Columbian Exhibition grounds. He says it will be an altogether American work and that "the glass makers of the United States are to manufacture the disk." There is no doubt but that Mr. Williams and the "glass makers of the United States" may be able to construct the largest telescope in the world; but will it have the value of any of the 4 or 5 inch instruments such as are found in almost every town of any considerable importance in the Union. The size of a telescope counts for nothing without a corresponding skill in its manufacture and mounting. All the telescope makers in the world would be unable to manufacture and mount such an instrument as Mr. Williams is said to propose, between this time and the opening of the World's Fair at Chicago.

ROCKS ARE DISINTEGRATED by vegetable organisms as well as by atmospheric agencies. It is well known and distinctly observable that plants of various kinds fasten themselves and grow from the surface and fissures of rocks. In their growth, they gradually assimilate such substances in the composition of the rocks as are needful for plant growth, and thus the hardest rocks may be gradually disintegrated.

MINERAL ULTRAMARINE has been discovered by Prof. Merrill of the Smithsonian Institute near Silver City, Colorado. This mineral has heretofore been found only in a few localities in Asia. Previous to the year 1814, this pigment was worth more than its weight in gold. It has since been gradually reduced in price, chiefly by artificial compounds which have taken the place of the natural mineral.

ELECTRICITY.

The Electric Railroad.

Great as has been the progress of improvements upon the electric railroad, and rapid as has been the extension of the system during the past two years, the indications are that such advances will be greatly exceeded during the next two or three years to come. The electric railroad is as yet in its early infancy, but its adaptability as a short route and cheap transportation agency, for both freight and passengers, has been fully proven.

Economy in this direction seems to be found in equipping such roads with light freight and passenger cars, the former carrying about five tons each. The cost of constructing and equipping such roads over a level country is a mere moiety of the cost of the ordinary steam railroad. So cheap are they, both in construction and operation, that almost every little farm neighborhood may have its local road as a feeder to the main line, by which the cost of transportation of produce to market may be greatly lessened. With a wide-reaching system of such roads in the valleys of California, our farmers would be completely emancipated from the extortions of the existing short haul systems which are acting as such a great incubus upon them that farming is utterly unprofitable except in certain favorable localities.

Suburban electric roads can be built and equipped for about \$10,000 per mile, which is the estimated cost of such portions of the roads now being constructed around the bay between this city and San Jose. Of course, when such roads pass through a hilly district, that portion of the route will be proportionally enhanced. In districts where water power can be employed to generate the electricity the cost of running them will be a mere song, as compared with steam. Such roads will not run long trains; two or three cars only will be run together, and at frequent intervals. As soon as the several roads of this description now in course of construction near this city are fully under way, their success, which is well assured, will engender an interest in this direction that will no doubt effect a speedy and most welcome revolution in transportation matters throughout all the great valleys in California. The merchants in all our cities and large towns will be no less benefited than the farmers at large.

This country is not the only one which is moving in this direction. The same hopeful experiments are being made in various parts of Europe. In Austria, what will probably be the most extensive electric railroad in the world, is now in an experimental way of evolution. This road is one on which, instead of trains, single cars of great length will be propelled by electricity supplied to them through the rails. The speed hoped to be obtained is from 120 to 150 miles per hour. To provide against accidents the roadway is to be built on solid masonry, without curves, steep gradients being adopted instead, if necessary. The great momentum of the cars will enable them to climb grades which would be insurmountable to a steam locomotive. As a further safeguard, the signalmen will have the power to stop the cars by shutting off the current in their section of track. The first experimental line is projected between Vienna and Budapest.

THE ELECTRIC LIGHTING OF TRAINS.—Electrically lighted trains are now rather the rule than the exception in Switzerland. The Jura-Simplon Company is fitting all its new carriages with the electric light, and a number of the old vehicles have been furnished with accumulators and glow lamps. The batteries are charged at Freiburg, which place, as we have previously had occasion to remark, supplies electricity at a cheaper rate than any other town in Europe. Each morning a number of vans of freshly charged accumulators leave Freiburg for the principal stations on the company's system, where the freight is distributed in exchange for the accumulators which have been doing duty in the preceding night in the various trains. In proportion, there are more electrically illuminated carriages in Switzerland than there are gas-lighted vehicles in France.—Ex.

"THE DEADLY WIRES."—Of course there is danger all around us, whether we walk the streets or lie quietly in our beds; in whatever vocation we may be engaged, we are never out of danger. The "deadly wires" have been harped upon lately, as a most unusual and unnecessary source of danger. True, many accidents have been due to them, but in far the greater number of cases such accidents have been the result of

carelessness or ignorance. But the wires have come to stay, and people must be educated up to a knowledge of how to put them up properly, how to handle them and how to avoid needless contact with them. Every observing newspaper reader must have noticed how great has been the reduction of accidents during the past year, and that too when the number and extent of the wires has been vastly increased. People are becoming educated. In no city has the cry against the wires been louder or more persistent than in New York, but little, however, is heard of it of late. Instead, we find in a late New York journal the following significant paragraph: "Mayor Grant, in his annual message, points out that only one death through overhead wires occurred in New York City in 1891, and that was due to the fall of a telegraph pole. There are now 143 high tension circuits, making 528 miles of electric light conductors underground, and 383 miles of low tension lighting in the Edison circuits. Mayor Grant recommends the establishment of a central municipal telegraph and telephone exchange.

THE SANTA ROSA AND PETALUMA ELECTRIC ROAD is sure to be inaugurated. Judge Barnum of Santa Rosa is quoted by the *Courier* as urging the early construction of the road by local capitalists and saying: "I am informed that the people of Petaluma are discussing this proposition and have the money to build the road if they want to. I will say this much: if your folks don't wake up and build the road I am positively informed that an English syndicate will. It would be better for Petaluma and Santa Rosa to own and operate the road, but you just mark my words that these English capitalists have their eye on the proposition, and the road will be a consummation within the next two years. If there is anything in it, and I believe there is, it would be better for our own people to reap the benefit of the enterprise."

THE TROLLEY SYSTEM of traction for street railways has been strongly opposed by the Mayor of Brooklyn, N. Y. He has once vetoed a resolution passed for that purpose, but the people seemed to demand such a concession and he has, more recently, wisely consented to the passage of a second resolution lately presented, and the work will now go ahead. Public opinion in several large Eastern cities seems to be favorable to the adoption of the "trolley system" as an economical method of traction, while railroad men are waiting for the devising of some better and permanent method. The horse must go; the cable is too expensive, and we must make the best use we can of electricity. The trolley now—something better further on.

THE SAN MATEO ELECTRIC CARS.—The cars intended for the San Mateo railroad, 15 in number, have been taken out to the carhouse at Sunnyside, near the old San Jose road. They are constructed in the same style as those on the California cable road—dummies at both ends—only smaller. They will be lighted as well as driven by electricity. This road will soon be in operation, and will exchange transfers with the Market Street, the City and the Central railway companies, so that one ticket will take a person from almost any part of the city to the park and to the cemeteries in San Mateo county.

THE NEW JERSEY ELECTRIC RAILROAD, to be constructed by the Pennsylvania Railroad Company, as noticed in these columns last week, is already under construction, work thereon having been commenced about the first of January. This, it is to be recollected, is to be a high-speed road and will run parallel to a steam road, with which it may be directly compared, both in relation to speed and economy.

ELECTRIC RAILWAYS IN ENGLAND.—The outlook for electric railways in England seems to be bright. The Brush Company is reported to have some very important and valuable contracts on hand, among which is the application of electric traction to the Liverpool Overhead Railway, and the South Staffordshire Tramway Company.

GOVERNMENT CONTROL OF THE TELEPHONE.—The Government of Belgium, some time last fall, notified the Bell Telephone Co., whose instruments are now used in Belgium, and which is at present doing all the telephone service, that on and after the 1st of January, 1892, the Government will assume and conduct the service.

WORK COMMENCED.—Work has already been commenced for transforming the Oakland Telegraph avenue horse railroad to an electric road.

ENGINEERING NOTES.

Oakland Water Front Improvements.

The memorial to Congress, in reference to the harbor improvements across the bay, adopted at the late bridge celebration there, recites at considerable length the history of that improvement. The project first took shape in 1873, when a board of engineers recommended improving the harbor by dredging the estuary, between Oakland and Alameda, to a depth of 14 feet at low tide, connecting it westward with the bay of San Francisco by a ship channel of similar depth, and 300 feet wide in the center of a channel 800 feet wide, protected on either side by stone jetties, projecting westward out into the bay of San Francisco a distance of about two miles. To keep this channel open, the plan included a canal 400 feet wide across the narrow neck of land which connects the peninsula of Alameda with the mainland. The estimated cost of the whole work was \$1,813,529. This sum, however, was based upon the assumption that the funds would be provided so that the work might be kept along continuously, without any stoppage, which latter would, of course, entail much additional expense. Instead of continuous work the appropriations were dealt out in dribs and drabs from year to year, from 1874 to September, 1890, at which latter date \$1,534,000 had been expended on broken periods of work. After the work had thus progressed 13 years, and \$900,000 had been expended, the further cost was reestimated, and the sum of \$1,590,000 fixed as necessary for its full completion, an addition of \$676,479 to the original estimate—a large portion of which additional amount was incurred by the parsimonious manner in which the appropriations had been made.

Of the second estimate, \$600,000 have been expended up to the present time, leaving \$990,000 of the second estimate to be appropriated and expended. Should Congress provide the funds as fast as needed, to admit of the work being carried on continuously, the contemplated improvements might be completed in two years. If, on the other hand, the appropriations are to be allowed to drag along, making frequent stoppages necessary, it will be many years before the long hoped for benefits from the work can be realized, and 30 to 40 per cent will have to be added to the second estimate.

It seems quite unaccountable that a great and rich government, which always has at hand all the material and capital required to carry out improvements acknowledged as necessary, should dally along with the work, now stopping and breaking up or scattering the plant, which has to be renewed at great extra expense at the next spurt of work, and so on for years, occupying 20 or 25 years in accomplishing a work that could and should have been done, with continuous labor, in less than ten years. In addition to the unnecessary expense of say, at least, 25 per cent for delays, a large amount of interest must be added and lost or paid by some one, for the money expended and lying idle for 10 or 15 years of delay.

Perhaps it should be accounted for as a result of our mischievous political system, of delays and hindrances, so that opposing parties or bosses may work their way in to handle and profit by the expenditure of the public moneys. We trust the time will soon come when partisan politicians will be relegated to back seats, and the legislation and governmental work of the country will be conducted upon honest business principles.

PROPOSED NEW SHIP CANAL.—The project for a ship canal across New Jersey, to connect New York harbor and Long Island sound with Delaware and Chesapeake bays and their tributaries, was discussed at the annual meeting of the New York Board of Trade and Transportation on the 14th of January.

Prof. Haupt, of the University of Pennsylvania, gave a brief description of the project, which provides for a channel of 33 miles in length, with three locks on either side of the summit level, which would be 50 feet above tide. The cross section is estimated to be 90 feet at the bottom, 150 feet at the surface and 20 feet deep, with locks 500 by 60 feet. The total distance would be about 90 miles from New York to Philadelphia, thus connecting by the cheapest known method of communication the most populous centers of the United States, at an estimated cost for the entire line of \$12,500,000.

Mr. Martindale said: "We believe that through the completion of this canal, your supply of anthracite coal (of which you used in New York and Brooklyn last year over 6,000,000 tons) will be delivered to your wharves at a saving of nearly \$3,000,000 per

annum, making a goodly return on an investment of over four times the amount required for the completion of the project."

GOOD HEALTH.

INDIAN SURGERY.—It is a mistake to suppose that the Digger Indian is entirely ignorant of how to proceed in cases of broken bones. A correspondent of the *Scientific American*, who once had some experience in sawmills in California, writes that journal as follows: On one occasion, while a number of Indians were curiously watching the operations of the mill, and standing near the double-flue boiler to keep warm, one of the flues suddenly collapsed in such a manner as to fatally scald one of the owners and hurl a poor old Indian woman some 20 feet away, breaking one of her legs below the knee. In the excitement of the occasion and the necessary care of the injured owner, the injury sustained by the woman was not observed and she was taken quietly away by the other Indians. Three or four days later quite a large number of Indians appeared in a hostile attitude on a near-by elevation which overlooked the mill. After taking their station, a tall chief approached and inquired for the "sawmill man," complaining that he had "shot off his sawmill" and broke the leg of a *mahale*, and he, the chief, was ready for a fight. The foreman took in the situation at once, invited the chief into the house adjoining, and showed him the stricken owner in the agonies of death. The chief then, in his turn, took in the situation from the opposite standpoint, and immediately exclaimed: "No intendi, accidenti. Me safe, no fite, all wano." We now append the interesting and surgical part of the story as given in the *Scientific American*: In a day or so after Mr. Hoxey's burial, the surgeon went to the *campudia*, and there sat the poor broken-legged *mahale*. The physician told me that the Diggers measured around the leg in several places, then cut a piece out of a slippery elm tree, near the size and shape of the leg, took the bark off, shaved off the outside and made as fine a splint as he ever saw, and fitted it around the broken limb, leaving the space open about one quarter of an inch on the top, and were pouring in a little water to keep down the fever heat, and that in a few weeks the squaw was limping around town again.

WOMEN AS DOCTORS.—The increase of women doctors in the city has been very marked lately, and several of them are now admitted as staff physicians at the hospitals and dispensaries. One great advantage that they seem to have over their rivals of the other sex is that they can tack out their sign and then go as professional nurses until business comes to them. The male doctor frequently has to starve through a course of a year or two, and then he frequently fails to make enough to keep the pot boiling. Women doctors are generally proficient nurses, and they are trained by nature and study to care for the sick. They can take a patient and prescribe for him, and then watch by the bedside until all is over. At the end double fees are demanded—the regular doctor's fees for prescribing and then the nurse's salary for watching and nursing the patient according to the prescriptions made out by herself. There is no doubt but a great advantage is obtained in this way, and the nurse and doctor are both held responsible for any mistake. Among babies and women the female doctor has a field which she is gradually making a specialty.—New York Times.

LIGHT IN CHILDREN'S BEDROOMS.—A medical writer says: If mothers notice that the brains of their little ones conjure up uncanny sights and thoughts from the shadows of a room more or less dark, let the light burn brightly. To force a child to become accustomed to the darkness is a grave error, if its nervous system is so organized that this forcing is productive of fright. The nervous system of a child is a very susceptible organization, and the deleterious impressions made upon it will often make their influence felt throughout its whole after-life. If the child asks for a light under such circumstances, *do not refuse it*.

SHOWER BATHS.—Many people advocate the shower bath, but few constitutions can stand it; in fact, it is highly dangerous to many persons of weakly habit, for they have no reactive power. Says a clever writer on this subject: "Every change in our growth and development is slow and gradual. If nature approved of sudden changes, she might make a man bald in a single night. We cannot stand shocks, and I don't believe we were ever intended to."

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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO:

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Passing Events.

The Miners' Association Committee to Congress left this week for Washington, where they will join the committee from the River Improvement Convention, and work for the common cause of improvement of California rivers and the construction of debris dams.

Several of the mining counties are preparing to organize permanent miners' associations as branches to the California Miners' Association. With this course pursued all over the State, a very strong organization will be perfected, which will be of great benefit to the mining interests.

The movement started by the recent Miners' Convention is meeting with universal favor, and the work is going on well in every direction. The various bodies, such as the Board of Trade, Supervisors, Chamber of commerce, etc., have taken the matter up in a favorable way and have lent their moral support, which will be valuable to the committees in Congress.

THE Yuba County Supervisors have given \$300 toward paying the expenses of the Miners' Committee to Washington. The Amador County Supervisors have also given \$100.

THE discovery is reported of a big vein of tin in the mountains about 50 miles north of Denver.

EL DORADO COUNTY is about to organize a County Miners' Association.

The Profits of Comstock Mines.

The evidence of Alvinza Hayward and W. S. Hobart, given on Feb. 8th and 9th, in the Hale & Norcross mining suit, shows that they, as mill owners, paid H. M. Levy, president of that company, about \$30,000, or one-eighth of the net profit of all the Hale & Norcross ores worked by the Nevada and Mexican mills for the years 1888-1889, up to June 30th, 1890.

As the mills worked between 79,000 and 80,000 tons of ore during that period, Levy's one-eighth shows a profit of \$240,000 to the mill company; and during all that time the managers of the mining company were assessing the stockholders of the mine. In other words, the rings got the bullion while the stockholders had the assessments for their share.

Mr. Baggett declared the plaintiff's case closed, and Mr. Wood, the principal attorney for the defense, promptly moved for a nonsuit, setting forth in addition to the usual statutory grounds that there was no evidence of conspiracy.

Judge Hebbard said: "That the Hale & Norcross has been defrauded out of a large amount of property there is no doubt in the mind of the Court, and there is a prima facie case of conspiracy as against the Hale & Norcross stockholders made out. The motion for a nonsuit is denied."

Is it any wonder, with such a record as this, exposed under enforced judicial inquiry, that the mining stock market of this city has gradually run down to a mere nothing from its former proportions? The mine managers, often with but a few shares of stock, and drawing salaries, instead of promoting the interests with which they are entrusted, promote their own interests in every way. They individually profit by the milling of the ore, while the stockholders of the mining company furnishing the ore, have to pay assessments to keep the mine running.

While such a record as this is an infamous one, it is, at the same time, a common one. There is nothing especially new or startling about it, except that the individuals engaging in such conspiracies are compelled to avow publicly their share in the transaction. Everybody suspected, or knew, the facts long before. And what is true of one mine may be, and probably is, true of many others.

Such a state of affairs accounts, in part, for the low esteem in which mining property is held on this coast, as compared with other property. With such prevalent dishonesty how could any business be conducted and prosper? And yet, these men who do these things find defenders on the plea of custom. It is only a pity that it is not also a custom to send people to the penitentiary who commit such breaches of trust, and allow business they are paid to manage to lose money, while they themselves make it.

There is little doubt that the principal Comstock mines, honestly and fairly managed, as are the principal gold mines of California, would pay the stockholders good profits. But under the monstrous system which has grown up with years, the dividends are few, while the assessments we have always with us. Meantime, a self-chosen few have grown wealthy, their riches being gathered from deluded investors and wrecked mines. The properties are worked by the so-called managers in such a way that they obtain profits, while the stockholders pay the expenses and receive no returns.

But it is all an old story, which has been periodically retold. The men of influence and wealth are arrayed in favor of the unwholesome system; so it stands. Their interests are involved. Those who would see a better state of affairs are unable to bring it about. Some time, of course, the end will come, but meantime the stockholders are impoverished. The stock market is a ten-cent gamble, the mines are being worked out, and the business as a whole brings the mining industry generally into disrepute. It will not be until those who are criminal conspirators in such schemes are brought up with a round turn, and sent to San Quentin, that the moral atmosphere surrounding Comstock mining will be cleared.

A Self-Appointed Representative.

The Executive Committee of the California Miner's Association felt rather chagrined on Tuesday morning when they read the following paragraph in the dispatches from Washington:

Californians occupied about an hour to-day in presenting their claims before the House Committee on Rivers and Harbors, arguing for a thorough system of river improvement that would place that branch of public works on a systematic and permanent basis. Mr. Devlin of Sacramento made a statement of the needs of the people on navigable streams, and furnished the committee with data and arguments that have heretofore been printed in California. Mr. Trumbo represented the miners of the State, and in an argument showed the importance of the mining industry, illustrated how it was handicapped, and asked for the construction of dams and other works that would permit the miners to work without injuring any other industry or class of people.

It happens that the Miners' Association Committee is on the train on the way to Washington to officially represent the miners of the State, and in their absence, Col. Isaac Trumbo, of this city, took the opportunity of airing his eloquence before the River and Harbor Committee. Now, the miners of California very decidedly object to Col. Isaac Trumbo, or any of his class, representing them on this or any other occasion. He has, doubtless, a perfect right to represent himself and appear before such a committee on his own behalf, but when he poses as representing the miners of the State, he does so only on self-constituted authority.

This man is just one of the class who wants to "get on and ride" with any successful movement, and he and his kind need to be promptly "sat on." He tried to get an appointment as a delegate from San Francisco to State Miners' Convention, and failed. He tried to be appointed on the Executive Committee of the California Miners' Association, and failed. He tried to get an appointment of honorary member of the Committee, so as to appear at Washington, and failed. A few influential men, who knew him slightly, spoke for him and wrote for him, but in vain. The mining men connected with the movement remembered the famous Sucker Flat mining transaction, and wanted none of Col. Isaac Trumbo. So, despite his efforts, he had nothing whatever to do with the miners' movement.

Imagine then, the man's monumental cheek, under these circumstances, when he goes to Washington and appears before the Committee "representing the miners of California."

In order to prevent any misunderstanding on the subject, and to place the delegation which left Tuesday in a proper light on their arrival at Washington, as the duly appointed and instructed delegates of the convention, the following dispatch was immediately forwarded to Judge Niles Searls and the delegates accompanying him:

SAN FRANCISCO, Feb. 9, 1892.

Judge Niles Searls:—Trumbo, without any authority, appeared before the Committee on Rivers and Harbors yesterday at Washington, representing himself as representative of the miners of California. This morning sent the following telegram to River and Harbor Committee, to Senators Felton, McKenna and other members from California:

"Colonel Isaac Trumbo is not a delegate from the California Miners' Convention; not a member of California Miners' Association. Has no authority to act for either body. Our delegates left for Washington last night."

[Signed,] W. C. RALSTON,
Secretary Miners' Association of California.

The several committees of miners and farmers had agreed upon a plan to carry out in Washington about which this Colonel Trumbo knew nothing whatever. Such a man as this, having no standing in the mining community, would do more harm than good in advocating a cause. California, like other mining States has always been cursed by a class of mining promoters, posing as practical mining men, who come to the front on every possible occasion. Their connection with various mining schemes has given them some little notoriety in connection with the industry, and they seek self-advancement on this basis. If Col. Isaac Trumbo, for instance, desired to "place" a mining property abroad, if he could show a clean bill from the French investors in the Sucker Flat mine, he might accomplish his object; otherwise, he probably

could not. Whether he has a mine for sale now or not, is unknown; but at all events, it will be well for him to cease attempting to represent the miners of California, their association having repudiated him promptly on the first occasion offered.

Timbering Drifts by English Method.

In recent numbers of the PRESS, the various plans tried for timbering bad ground in the tunnel of the Croton aqueduct have been described. Those thus far referred to were all failures. Then an entire change in the management took place and M. Nolan was appointed foreman in charge. The English system was introduced and the work was completed without serious interruption in a year and two months.

The entire excavation made was allowed within the limit of 676 square feet, or 26x26 feet. This permitted the placing of a 2-foot timber platform and 24 inches of brick masonry. The average area excavated was 507.7 square feet.

The first two stretches of 13 and 12 feet occupied respectively 20 and 12 weeks. Against advice, a top-central drift was first run about 18 feet, and, as the rock was found on the west side, the widening was done from west to east; about 15 crown bars were placed and a bulkhead built. The bench was then removed to 4.2 feet below grade. A platform two feet thick, formed of cross and longitudinal timbers, 12x12 inches, was built. Upon this the invert was laid and the masonry completed.

Widening out the second stretch, several of the crown bars on the east side broke and the weight of the ends resting on the masonry arch caused it to crack for eight feet. This difficulty was overcome by supporting the arch with oak centering, and also by placing a large 24-inch longitudinal timber in the center, supported by posts about 6 feet long from the invert and mud sills. From this, radial pieces were placed to the crown bars above. Finally, the bottom was removed and the platform placed. The cracked portion of the arch was subsequently rebuilt.

Top drifts were still persisted in, both here and in the heading from Shaft 13 A, which had now reached the other end of the soft ground; but after two weeks' further trial, the foreman was finally forced by the mud, sand and water, to abandon them.

As above mentioned, the English system was finally adopted, and the following is a description of its application:

The beginning was made four feet north of the soft ground. The first 54 feet were worked from the top down; the remaining 60 feet, from the bottom up.

Referring to shaft 13: On January 28, 1888, the excavation and masonry had reached 778+45, and a small preliminary bottom drift, 2 feet by 3 feet, was driven through, connecting both headings, and the top drift from the driving of the previous section was at Station 778+55.

The First Operation.—The lower drift was enlarged to 6 feet by 8 feet for a distance of 25 feet. (A, Fig. 1.)

The Second Operation.—Widening out of the drift. Bearing bars (B, Fig. 1), 20 feet long, were placed under the caps, and supported by posts, resting on longitudinal sills bb. The operation of widening out, on either side as most convenient, was then done, and the bars, posts and sills (c, c, c, d, d, d and e, e, e) placed. The process of widening is shown on the left of the drawing, Fig. 1.

The Third Operation.—The placing of the timber platform. The previous operation being well advanced or completed sheet-piling was driven down 5 or 6 feet outside of the sills b, b, e, e, etc., and the enclosed spaces were excavated in pockets to a depth of 4.5 feet below invert grade for a length of 18 feet, and as wide as possible, generally 10 or 15 feet. Posts b', e', etc., placed at intervals measuring 7 feet (Figs. 1 and 2) resting on foot boards in the mud, now support the system. Sheet-piling

(F, Fig. 2), 3 or 4 feet long, was then driven across the bottom of the excavation about 15 feet in advance of the completed invert. This prevented the mud from being pumped out from beneath the platform during the construction of the succeeding section. The longitudinal sills G, in variable lengths up to 15 feet, were then placed in the excavated spaces between the posts b' , b' , b' , etc. Underpinning was then employed in order to get the longitudinal sill in the space interrupted by the line of posts. Immediately behind the first post, a cross sill (H, Fig. 1) 6 feet long was placed on blocks 6 inches above the sills in place. The weight was transferred to this and the first post removed. The second post was removed in a similar way. The third post was supported by struts (X, Figs. 1 and 2). The sill G in the vacant space was in half lengths and was slipped into place as shown in Fig. 2. The cross sills H were then placed. The sills put in were as long as circumstances would allow, and arranged to break joints. The posts e' (Fig. 4), on the outside, could seldom be removed, and longitudinal pieces

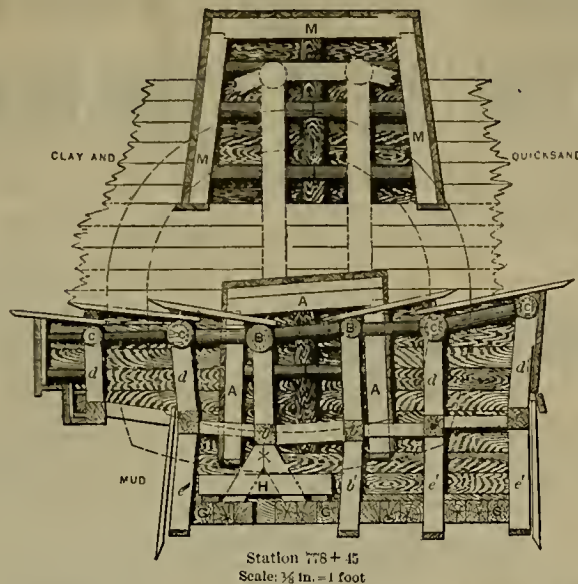


FIG. 1.—SUCCESSFUL ADVANCE OF DRIFT BY ENGLISH METHOD.

supported by the posts, P (Fig. 5), resting on the cross-sill, O, and two longitudinal sills, N, placed in the top-heading (Figs. 3, 4 and 5). The excavation was carried down and out at the same time, and the other bars were supported by the struts, Q, resting on the bearing bars, B, C, etc., (Fig. 3). The large beam, S, (Figs. 4 and 5), 24 inches by 24 inches, 26 feet long, was then placed ahead of the invert, and supported by posts resting on sills in the bottom, and strutted back to the invert by the rakers, u. Posts, T, were placed under the crown bars and set upon this sill, which also served as a bearing for the bulkhead against the mud in the face. When the section was completed, the sill was cut off and removed, the ends being built in. To support and strengthen the crown bars, the segmental timbers, v, supported by posts resting on foot-blocks on the masonry already built, were put in, one or two feet apart as necessary. The sidewalls and the arch were finally constructed. No attempt was made to withdraw the crown bars.

This was the general order of operations,

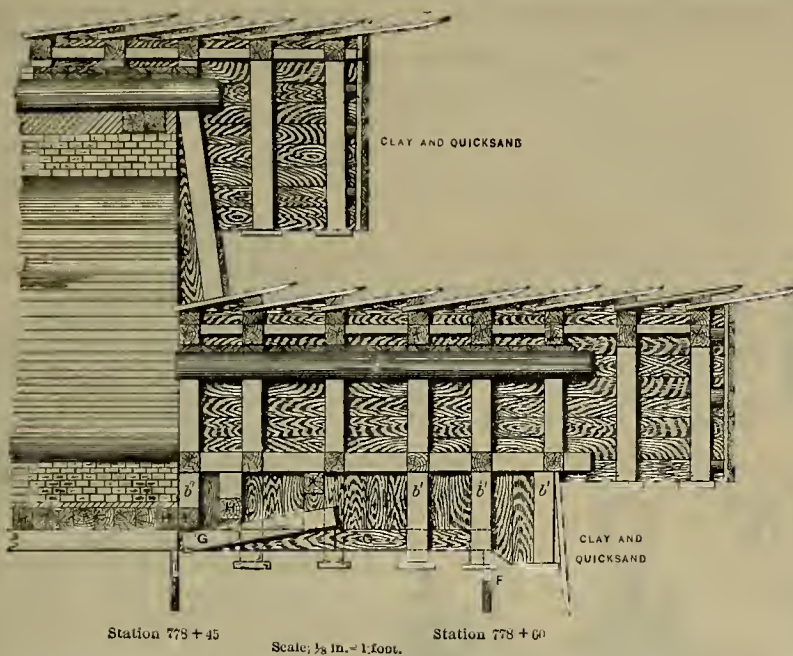


FIG. 2.—PROGRESSIVE TIMBERING BY ENGLISH METHOD. LONGITUDINAL SECTION OF FIG. 3.

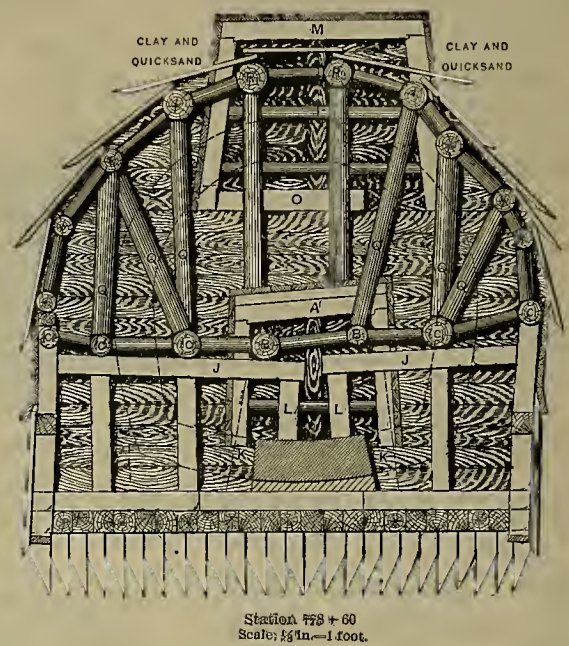


FIG. 3.—PROGRESSIVE TIMBERING BY ENGLISH METHOD. CROSS SECTION THROUGH FIG. 2.

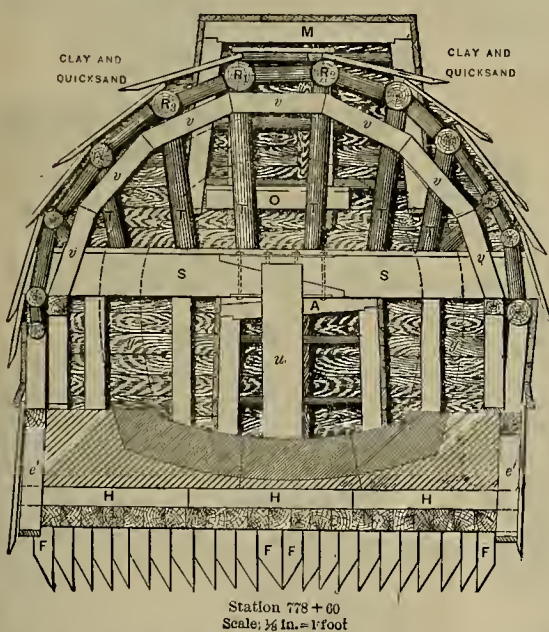


FIG. 4.—COMPLETION OF TIMBERING AND SETTING OF INVERT.

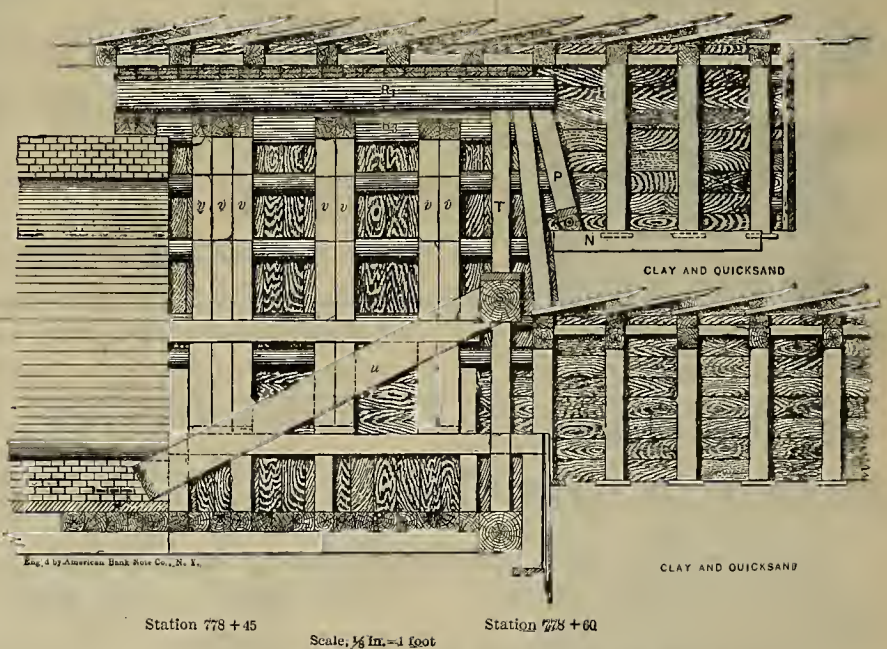


FIG. 5.—LONGITUDINAL SECTION THROUGH FIG. 4.

were placed between them. The excavated space ahead of the platform was used as a sump for pumping.

The Fourth Operation.—The platform being completed, the cross beams, J (Fig. 15), supported by the inclined posts, k, k, were placed about 3 feet between centers under

the bearing bars, B and C, and well wedged up. The posts and sills, b, b, d, e, and e', were removed, and the central portion of the invert built between K K, which were replaced by L L (Fig. 3), and the remainder of the invert and 2 feet of side wall and backing was built (Fig. 4).

While the masonry was being built, the top-heading, M (Fig. 3), was advanced 15 feet to + 70.

The Fifth Operation.—The crown bars, R, R, etc., (Figs. 3 and 4), were placed. The back ends rested on the arch already built, and the heading ends of the first two were

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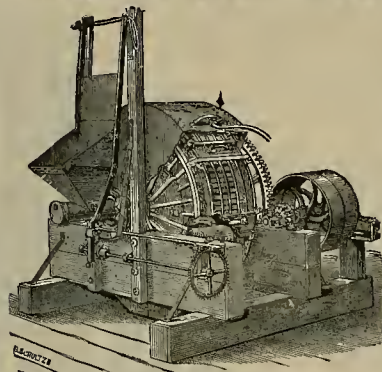
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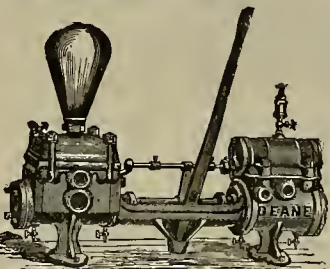
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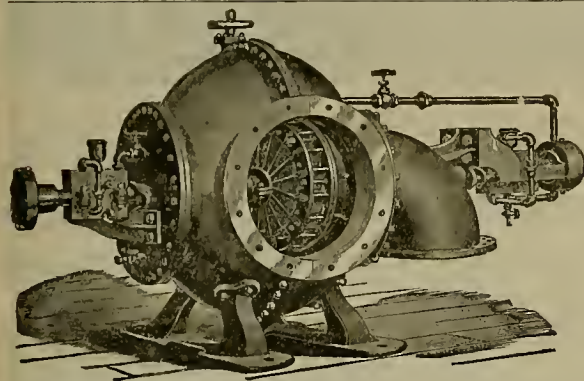
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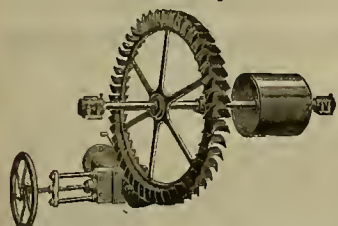
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Justice M Co, Nevada.	49.	25.	Jan 11, Feb 15, March 7.	R E Kelly, 419 California
Keystone Cons M Co, California.	2.	\$8.50.	Jan 30, Mar 7, Mar 28.	J H Ham, 310 Pine
Martin White M Co, Nevada.	27.	25.	Jan 8, Feb 11, March 12.	K L Rose, 120 Sutter
Mexican G & S M Co, Nevada.	44.	25.	Jan 14, Feb 17, March 10.	O E Elliott, 309 Montgomery
Middle Creek G Co, British Columbia.	2.	50.	Jan 16, Feb 20, Mar 22.	H D Hawks, 318 Pine
Northwestern Cons M Co, British Columbia.	4.	25.	Dec 15, Jan 22, Feb 15.	B Bonachia, 433 California
Oceidental Cons M Co, Nevada.	9.	25.	Jan 8, Feb 16, March 10.	A K Durbrow, 309 Montgomery
Overman M Co, Nevada.	63.	50.	Feb 10, Mar 16, Apr 6.	G D Edwards, 414 California
Savage M Co, Nevada.	78.	50.	Feb 2, Mar 8, Mar 26.	E B Holmes, 309 Montgomery
San Francisco M & M Co, California.	1.	20.	Jan 12, Feb 16, March 8.	Chas H Osborn, 309 Montgomery
Sierrita M Co, Nevada.	101.	30.	Dec 15, Jan 22, Feb 15.	A Chemant, 328 Montgomery
Sierrita Nevada M Co, Nevada.	101.	30.	Feb 1, Mar 4, Mar 24.	E L Parker, 309 Montgomery
Siskiyou Cons Quicksilver M Co, California.	2.	20.	Dec 2, Jan 23, Feb 19.	E F Stone, 306 Pine
Tenckoff G & M Co, California.	7.	10.	Jan 2, Feb 2, Feb 23.	W J Gunneth, 368 Pine
Union Cons S M Co, Nevada.	45.	25.	Jan 6, Feb 11, March 2.	A W Barrows, 303 California
Weldon M Co, Arizona.	5.	50.	Feb 9, Mar 15, Apr 14.	A Waterman, 300 Montgomery
Yellow Jacket M Co, Nevada.	50.	50.	Feb 2, Mar 4, Apr 2.	W H Blauvelt, Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	MEETING.	SECRETARY.	DATE.
Natoma Water & M Co, California.	Annual.	D H Ward, 508 California.	Feb 15
Watt Blue Gravel M Co, California.	Annual.	G A Berton, 323 Montgomery.	Feb 15

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Ohampton M Co.	10.	T Wetzel, 320 Sansome.	Aug 15
Oons Cal & Virginia M Co, Nevada.	30.	A W Halsey, 309 Montgomery.	Sept 10
Opita M Co, Nevada.	30.	E M Hall, 314 Montgomery.	Sept 10
Eureka Cons M Co, Nevada.	25.	J P Bush, 101 Sansome.	Jan 5
Great Western Quicksilver M Co.	25.	A Halsey, 328 Montgomery.	Oct 1
Idaho M Co, Grass Valley.	3.00.	Grass Valley.	Oct 1
Mayflower Gravel M Co, California.	1.00.	A H Clough, 230 Montgomery.	Feb 10
Pacific Coast Borax Co, California.	1.00.	A H Clough, 230 Montgomery.	Feb 10
Standard Cons M Co, California.	10.	W Pew, 310 Pine.	Dec 22

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, FEBRUARY 11, 1892.

General trade continues quiet, but the conviction strengthens that a change for the better is near at hand, provided the weather continues in farmers' favor. The money market is essentially unchanged. Commercial and savings banks report large reserves on hand with a light inquiry ruling. This condition of affairs obtains in the East also, as mail advices from New York report that on January 30 the banks had a total of \$163,339,100 in specie and legal tenders, against a similar total of \$126,704,300 a year ago, and of \$121,565,600 the first Saturday of February, 1890, largely exceeding that of any reserve heretofore held by the banks of the city. The increased general stock of currency in circulation must necessarily be taken into calculation. Another fact observed is the disposition of farmers and those who have profited from agriculture to apply the proceeds of sales to the removal of indebtedness rather than to contract new liabilities. In Boston this is noticed as being particularly true of the Central States, where dealers are carrying light stocks of goods and this is regarded as an omen of activity in mercantile circles later on. Regarding the situation in New York investment circular remarks that with such accumulations of capital and with a very large part of our enormous crops yet to be sold and paid for, there is reason to believe that improvement is near at hand. While the above is true of this country, European advances up to Feb 2 state that at London, call money was firmer at 1 1/2 per cent, with a loan and a bid to get even at 10 per cent, because of the unsettled condition of financial affairs in Europe. Bankers in the United Kingdom and on the Continent not only hesitate to make new loans on export staples, but are calling in old ones as fast as possible, as a precaution against emergencies. The trouble is not believed to be serious, but it is certainly worthy of note.

QUICKSILVER—Receipts of the bulk week aggregate 332 flasks, and exports 75 flasks, to Mexico. The market is reported steady at current quotations.

MEXICAN DOLLARS—Market is dull at 71@71 1/2 c.

SILVER—The market in New York fell to 89 1/2 c on last Monday, but to-day it is quoted at 89 3/4 c. These are the lowest prices touched within the history of the trade. No one appears able to give a reasonable solution of the influence at work in bringing about such a state of affairs. The Mint purchases not only continue to absorb this country's production but gradually reduce the reserve stock. The House Committee on Coinage, Weights and Measures reported on yesterday practically a free coinage bill. The bill provides that "the unit of value in the United States shall be the standard silver dollar as now coined, 423 1/2 grains of standard silver, or the gold dollar of 25 3/10 grains of standard gold; standard gold and silver coins of the United States to be legal tender in payment of all debts. Any holder of gold or silver bullion of the value of \$100 or more of standard fineness shall be entitled to have the same struck into any authorized standard coins of the United States free of charge at the Mints of the United States, or may deposit the same at such Mints and receive therefor coin notes equal in amount to the coinage value of the bullion deposited, and the bullion shall become the property of the Government, the coin notes so issued to be in denominations of not less than \$1 nor more than \$1000, and to be also legal tender." The Act provides for the retiring of outstanding gold or silver certificates or treasury notes. Commenting on the bill Representative Brand says that "the bill is different from all others introduced in one particular: it contemplates the converting of all our silver money, silver certificates and treasury notes issued on bullion, and gold certificates issued on gold, into coin notes, redeemable in coin, thus converting our paper into a bimetallic paper, instead of keeping up the distinction between gold and silver in our paper issues. This conforms to the idea of coining both metals on an equality, gold and silver both being free."

BORAX—Receipts the past week aggregate 365 cts., and exports by sea 110,841 lbs. The market is fairly steady.

LIME—Receipts the past week aggregate 2910 hhls. Exports to Honolulu continue free. The home demand appears to be enlarging.

COPPER—The market is easy at current quotations. New York *Iron Age* says: "Prices are now down to a level that leaves numerous small producers little or no margin of profit, and a further depression in values, according to current reports, would cause some of those concerns to either suspend operations or impair their finances. Copper keeps coming upon the market from some source or other in greater quantity than is needed to satisfy current wants."

LEAD—The market is reported essentially unchanged. Eastern advices report a slow market.

TIN—In both pig and plate the market is reported inactive.

IRON—The market holds to strong prices owing to free consumption in this State and up north reducing stocks. If the present prospects for a large wheat crop in this State continue to hold in the spring months, then large shipments to this coast of iron will be made from England in vessels coming here for outward cargoes.

COAL—Imports the past week aggregate as follows: Departure Bay, 4742 tons; Seattle, 7450; Comox, 4150; Nanaimo, 2373; Coos Bay, 760; total, 19,467 tons. The market continues overstocked. Owing to the favorable outlook for wheat crops on this coast, coal importers do not appear disposed to take up vessels for loading in Australian ports at ships' present asking rates for coal cargoes to this port.

San Francisco Metal and Coal Market.

THURSDAY, February 11, 1892.	
ANTIMONY.	STEEL.
Per lb. BORAX. @ 15 1/2	English, lb. 16 @ 20
Refined, in car lots @ 8	Canton tool. 9 @
Powdered, do. 7 1/2	3 1/2" Diam tool. 9 @ 9
Concentrated, do. 7 1/2	4" Diam. 10 @
All grades jobbing at advance.	Machinery 4 @ 5
	Toe Chalk. 4 1/2 @ 5
COPPER.	TINPLATE.
Bolt. 22 @	S. V. steel grade. 6 00 @
Sheathing. 22 @	14x20, spot. 6 00 @ 5 50
Forgot, jobbing. 14	Charcoal, 14x20. 6 00 @ 5 50
Do, wholesale. 13	Do roofing, 14x20. 6 00 @ 5 50
Fire Box Sheets. 24	Do, do, 20x28. 12 00 @ 13 00
IRON.	PIG IRON.
Bar, base. 3 @	Spot @ lb. irreg. 21 @ 21 1/2
Norway, base. 4 @	5 1/2" nominal. 21 @ 21 1/2
FIG IRON.	SPOT COAL.
Eglington @ ton. 26 00	Wellington. \$8 25
Glenbrook. 26 00	Gretton. 7 50
Am. Soft. No. 1. 25 00	Nanaimo. 7 50
Oregon Pig. 30 00	Gilman. 6 50
Put Sound. 30 00	Seattle. 7 00
Clay Lane White. 25 00	Coos Bay. 7 00
Shotts, No. 1. 26 00	Channel. 9 50
Langdon. 26 00	Egg, hard. 14 00
Thorndike. 26 50	Cumberland, in sacks. 10 00
Gatchemire. 26 00	Walsell. 9 00
Barrow. 26 00	Do, in sacks. 10 00
Cargoeft. 24 00	Scotch Splint. 8 00
Per ton. 10 00 @	Brymbo. 8 00
LEAD.	WEST HARTLEY.
Pig. 4 1/2 @	To Lead. 8 50
Bar. 5 1/2 @	Australian. 8 50 @
Sheet. 7 1/2 @	Liverpool Steam. 7 50 @
Pipe. 6 1/2 @	Scotch Splint. 7 50 @
(Discount 10% on 500 bags.)	Cardiff. 7 25 @
Drop, @ bag. 1 90 @	Cumberland. 9 50 @
Suck, @ bag. 2 10 @	Egg, hard. 12 00 @ 13 00
Chilled. 2 10 @	West Hartley. 8 50 @ 9 00
QUICKSILVER.	ENGLISH.
Home trade, pr. 43 00 @	English, to load. 90 @ 11 00
Ask. 43 00 @	Do, spot, in bulk. 11 00 @
For export. @ 35 00	Do, in sacks. 13 00 @

Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:	
ARIZONA MINES.	Dr. Cr.
Crocker. \$	4,437
Peerless. 5,593	Justice. 9,723
Peerless. 4,989	Kentuck. 5,625
Peerless. 631	Lady Washington. 8,329
Welson. 313	Mercur. 1,021
	Oce dental. 12,512
BODIE MINES.	Ophir. 1,284
Sodie. 14,778	Overman. 23,781
Bulwer. 15,331	Potosi. 1,612
Mon. 5,815	Savate. 24,453
Standard. 29,689	Seg. Belcher. 2,506
Summit. 400	Socon. 4,771
Syndicate. 2,191	Sierr. Nevada. 3,128
COMSTOCK MINES.	Union. 5,234
Alpha. 14,712	Utah. 1,511
Aita. 3,271	
Andes. 5,169	TUSCARORA MINES.
Belcher. 25,547	Selle Isle. 12,515
Belmont. 75,320	Commonwealth. 24,281
Best & Belcher. 7,794	D-I Monte. 15,590
Bullion. 999	Diana. 133
Caledonia. 9,381	Grand Prize. 5,450
Challenge. 6,338	Independence. 202
Chollar. 22,138	Nevada. 24,875
Confidence. 7,555	Nevada Queen. 23,398
Con. Cal. & Va. 35,163	North Belle Isle. 32,815
Con. Imperial. 9,916	N. Commonwealth. 2,889
Con. New York. 4,833	Copita. 14,749
Crows Point. 11,125	MISCELLANEOUS MINES
Exchequer. 29	
East Sierra Nev. 781	Holmes. 40,415
Gould & Curry. 9,729	Mt. Diablo. 8,991

NOTE—Con. Cal. and Va. has bullion valued at \$29,323, with further increase to arrive. Peerless bullion valued at \$8790.37. Navajo has \$12,300 due on pumping account.

THE Government of Ceylon has voted £800 for an exhibit at the Chicago Columbian Exhibition, and made application for 12,000 feet of space.

Assessment Notices.

SAN FRANCISCO MILLING AND MINING COMPANY.
Location of principal place of business, San Francisco, California. Location of works, West Point, Calaveras County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 12th day of January, 1892, an assessment, No. 1, of Two (2) Cents per share, was levied upon the issued Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, Room 56 Nevada Block, 309 Montgomery Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of February, 1892, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 8th day of March, 1892, to pay the delinquent assessment together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

CHAS H. OSBORN, Secretary.

Office, Room 56 Nevada Block, 309 Montgomery Street, San Francisco, California.

GRAY EAGLE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of January, 1892, an assessment, No. 2, of Six (6) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of February, 1892, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 7th day of March, 1892, to pay the delinquent assessment together with the costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. BARROWS, Secretary.

Office, Room 11, No. 303 California Street, San Francisco, California.

KEYSTONE CONSOLIDATED MINING COMPANY.

Location of principal place of business, San Francisco, California. Location of work, Amador City, Amador Co., Cal. Notice is hereby given that at a meeting of the Board of Directors, held on Saturday, the 30th day of January, 1892, an assessment (No. 2) of Two Dollars and Fifty Cents (\$2.50) per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the Company, No. 310 Pine St., room 4, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of February, 1892, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 25th day of March, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.

By order of the Board of Directors.

J. H. ISHAM, Secretary.

Office, No. 310 Pine St., Room 44, San Francisco, Cal.

CALIFORNIA VERDE ANTIQUE MARBLE COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 2d day of February, 1892, an assessment (No. 2) of One (1) Cent per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, 308 Pine Street, San Francisco, California.

Any Stock upon which this assessment shall remain unpaid on the seventh (7th) day of March, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the twenty-eighth (28) day of March, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

W. J. OURNETT, Secretary.

Office, 308 Pine Street, San Francisco, California.

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C. S. HALEY, Secretary.

Advertisement for Proposals!

TUNNEL.

SEALED PROPOSALS WILL BE RECEIVED BY THE Directors of the Bear Valley Irrigation Company at Redlands, California, until March 1st, 1892, for the construction of a Tunnel about 6000 feet in length through rock, in accordance with the plans and specifications on file in the office of the undersigned. Bidders may propose to furnish their own plant, or to use a complete power, drilling, hauling and ventilating plant to be furnished by the Company. Each bid must be accompanied by a certified check for not less than 2% of the amount of the proposal. The Directors reserve the right to reject any or all proposals. EDWARD M. BOGGS, Engineer, Banning, California.

HORACE D. RANLETT,
Ores, Mining, and Commission,
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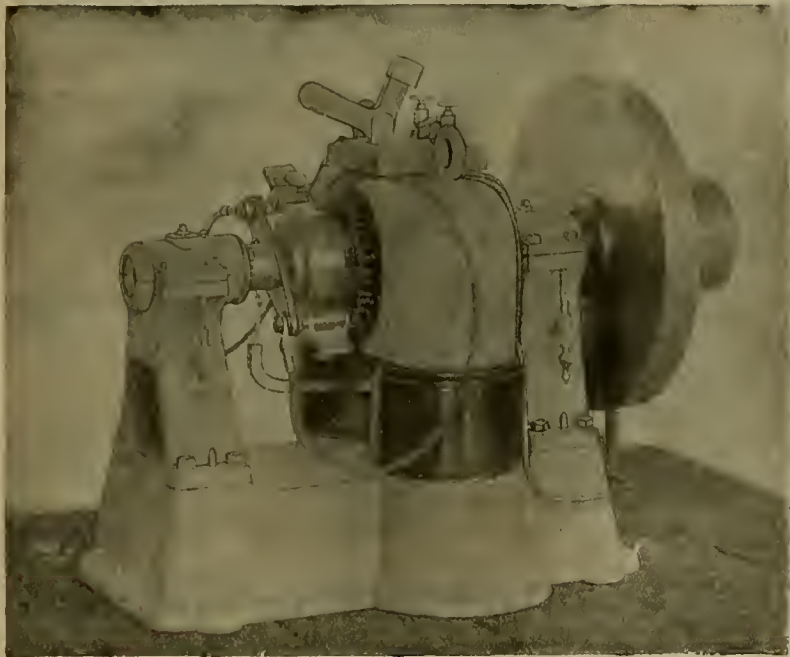
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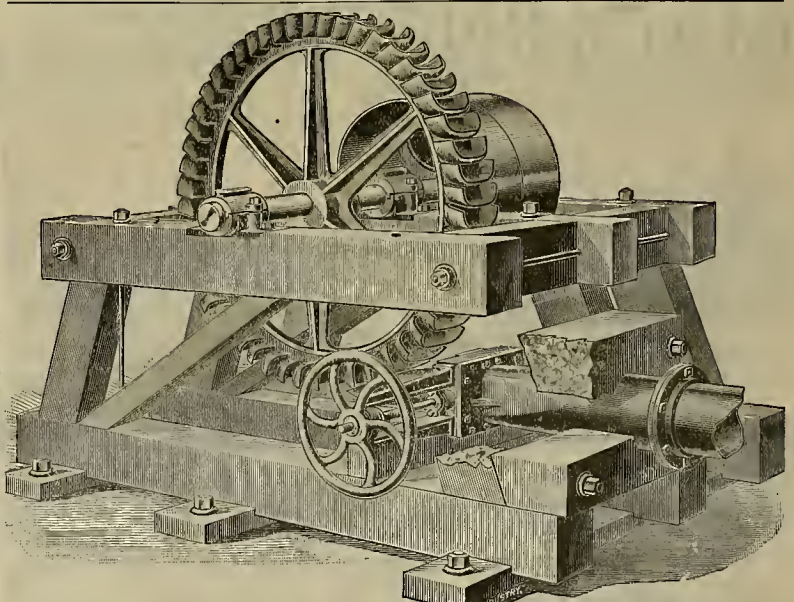
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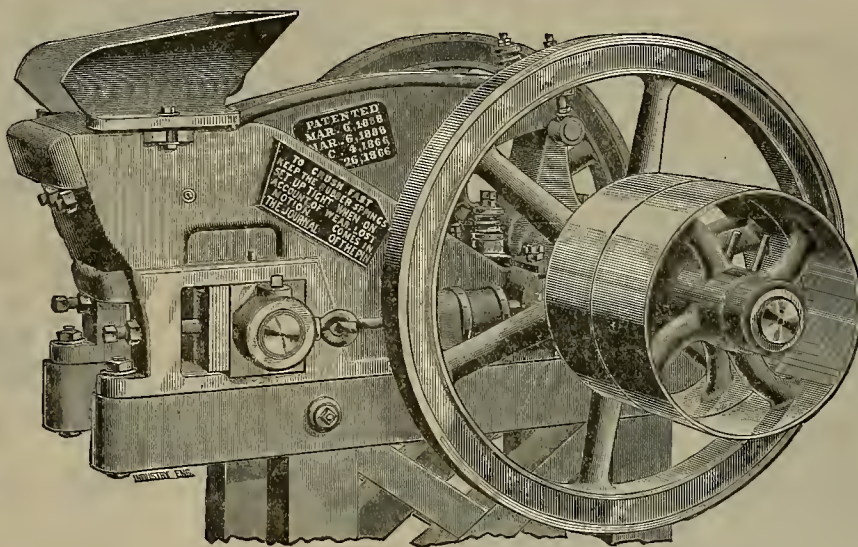
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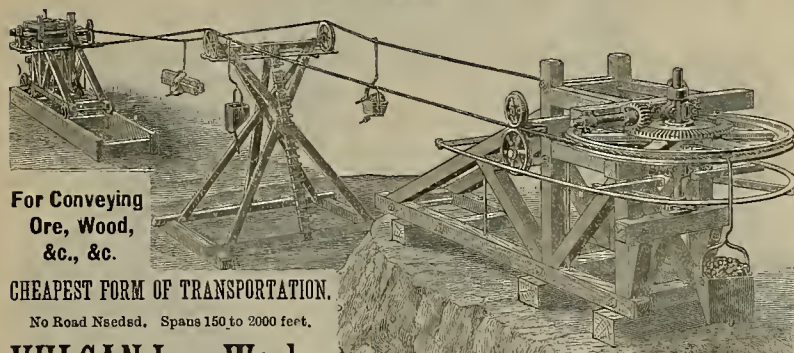
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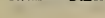
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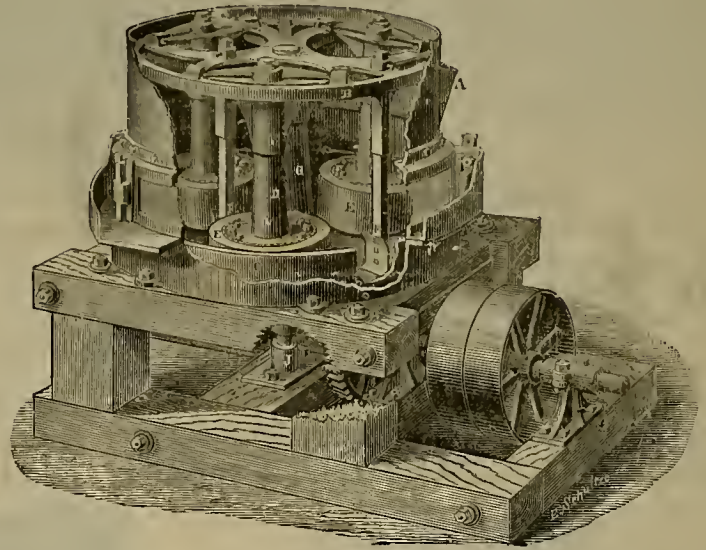
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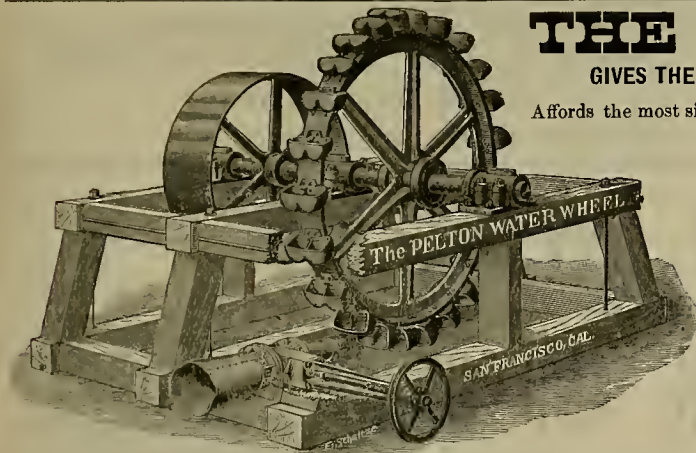
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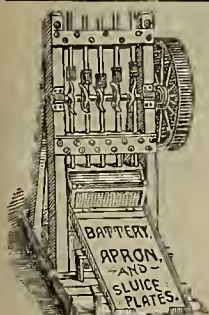
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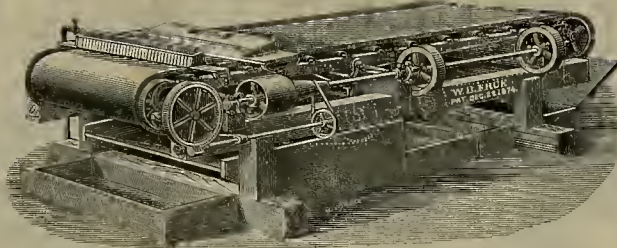
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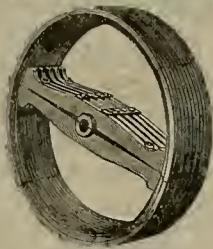
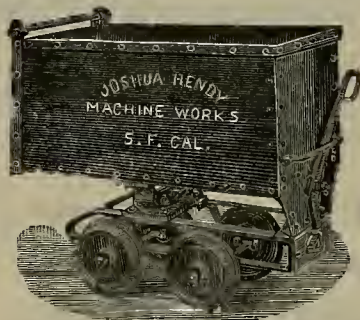
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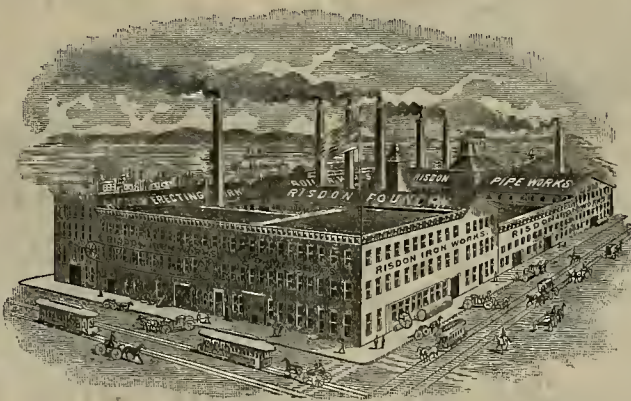
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV. — Number 8.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, FEBRUARY 20, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Ice-Making Machinery.

A branch of mechanical science which demands a high degree of skill is that of mechanical refrigeration and the manufacture of pure ice. It was long since discovered that certain gases, such as ammonia and carbonic acid, could be changed from a gaseous to a liquid, and even solid state, under certain conditions of pressure and temperature. It was further found, that if the pressure which maintained the gases in a liquid state were removed, the substances would return to their gaseous state, generating by the change a very intense cold. It was also observed that certain substances could, in some manner not very well understood, absorb a very large quantity of ammonia gas. Upon the scientific knowledge of these two principles, the whole of our present system of mechanical refrigeration is based.

The principles are practically the same in all the different refrigerating machines, merely modified by each manufacturer to suit his own ideas. In the compression system the three stages of operation are as follows: 1, compression of the gas; 2, condensation of the gas and a withdrawal of the

heat caused by compression; 3, expansion of the gas and absorption by it of the heat from the surrounding objects. The absorption system differs only in slight particulars

and the direct expansion system. In the brine system the evaporating coils are submerged in tanks filled with strong brine made with common salt. The ammonia absorbs the

heat from the brine and reduces it to any temperature named. For refrigeration the brine is pumped through a system of coils which are placed in the rooms to be cooled, and the brine absorbing the heat returns to

the tank to be again cooled, and so on continuously. In the direct expansion system the ammonia evaporating coils are themselves placed in the rooms to be refrigerated, and the ammonia thus absorbing the heat by direct application in the expansion coils gives the name to the system.

The utilization of refrigerating processes for commercial purposes has developed wonderfully of late years, and especially as applied to railway and steamship transportation. The processes are used also extensively in brewing, distilleries, meat preservation, fruit-shipping, cold storage, etc., etc. Among the most improved ice-making and refrigerating machinery is that of "The Hercules," for which the Parke & Lacy Co. of this city are agents, on the Pacific Coast. This machinery is used for ordinary refrigerating purposes and the manufacture of ice also.

For the latter purpose, the system of distillation and complete filtration carried out by the Hercules machines is excellent. By the process adopted, they use all the exhaust steam of the engine, thus utilizing what would otherwise be a waste. The needed power

(Concluded on page 140.)



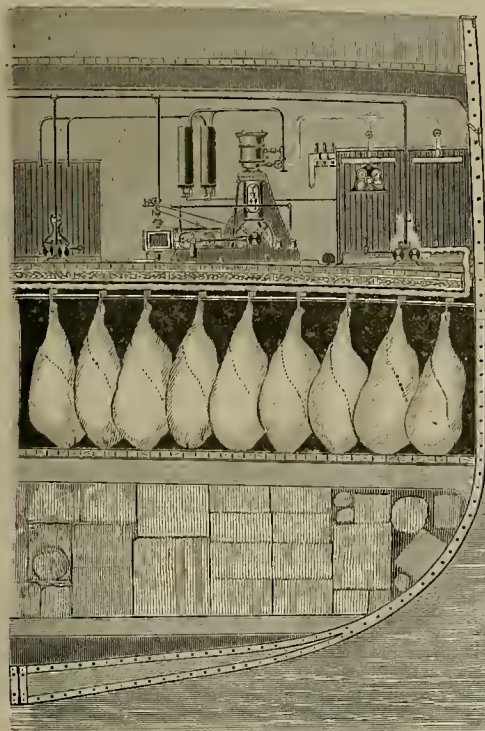
THE HERCULES MODEL ICE PLANT.

from the foregoing. The vacuum system is different, but it is used for ice-making only.

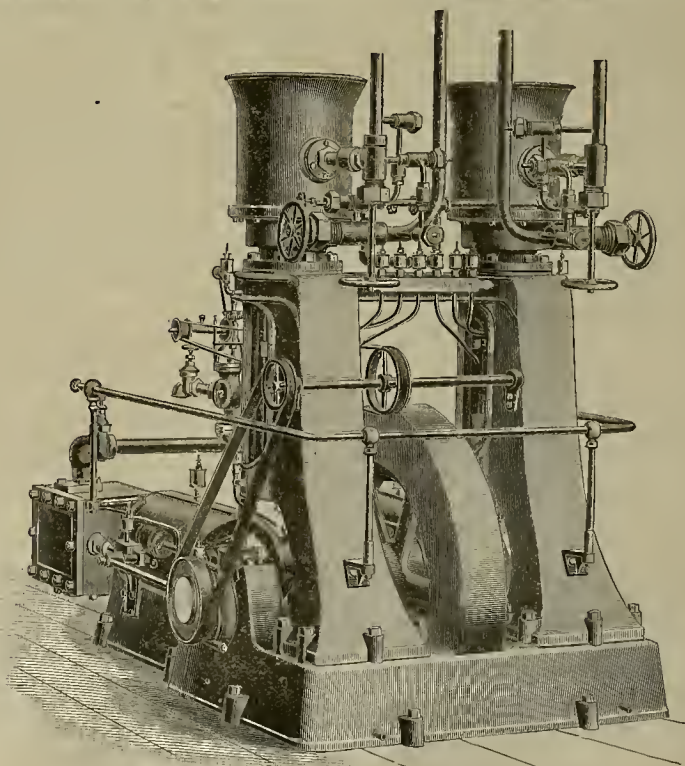
To utilize the cold from either of the two plans for producing artificial cold, two methods are employed—the brine system,

heat from the brine and reduces it to any temperature named. For refrigeration the brine is pumped through a system of coils which are placed in the rooms to be cooled, and the brine absorbing the heat returns to

machines is excellent. By the process adopted, they use all the exhaust steam of the engine, thus utilizing what would otherwise be a waste. The needed power



STEAMSHIP REFRIGERATION.



HERCULES ICE MACHINE FOR STEAMSHIP REFRIGERATION.

Systematic Mineralogy.

This is the title of a volume by T. Sterry Hunt, issued by the Scientific Publishing Co. of New York. It is really a notable work of the greatest interest to the student of mineralogy. Some idea of its scope may be gained by giving the headings of certain of the chapters, as follows: The relations of mineralogy, mineralogical systems, first principles in chemistry, chemical elements and notation, specific gravity, coefficient of mineral condensation, theory of solution, relations of condensation to hardness and insolubility, crystallization, constitution of mineral species, a new mineralogical classification, mineralogical nomenclature, synopsis of mineral species, mineral history of waters, mineral names. The aim of the writer in the mineralogical system proposed has been to observe a strict conformity to chemical principles, and at the same time to retain all that is valuable in the natural-history method, the two opposing schools being reconciled by showing, that when rightly understood, chemical and physical characters are really dependent on each other, and present two aspects of the same problem, which can never be solved but by the consideration of both. Hence it is thought proper in the introductory chapters of this volume to explain in a somewhat elementary manner, such principles of physics and chemistry as seem necessary for a clear understanding of this relation.

The question of scientific nomenclature on mineralogy is one of much importance. The barbarisms of the trivial names now universally employed are only too evident, while the endeavors to replace them by something better have been many. How far the author has succeeded in his effort to construct a new nomenclature must be left to his colleagues to decide. While following, so far as appeared practicable, that of Breithaupt, he has been led to devise one which is, in a great part, novel. Whether his groupings of species into genera will satisfy mineralogists remains to be seen. He can, however, claim the merit of having followed a definite plan, and created a binomial Latin nomenclature which is consistent and logical. Following the discussion of this question, in Chapter XII will be found a "synopsis of mineral species," which gives a connected view of the nomenclature adopted, with the scientific and trivial names of the species recognized in the present treatise.

In the next three chapters are concluded the orders, genera and species which make up the first three classes in the present system, the species of each genus being tabulated, with their scientific and trivial names, while opposite them, in separate columns, are given for each species the calculated value of the chemical unit, the specific gravity, and the reciprocal of the coefficient of condensation. The hardness of each species on the scale of Mohs, and an indication of its geometric form, in the case of crystalline species, are inserted in the table.

In describing the several orders, genera and species, there is given an explanation of the nomenclature here adopted, together with a discussion of their more important historical and chemical relations. In class IV, where the species are for the most part undefined, the author has introduced certain details with regard to the more important bodies, graphite, diamond, petroleum and coals, upon which more precise information than is to be found in other mineralogical treatises was much to be desired. In the final chapter, various questions connected with natural waters in their mineral relations have been discussed, with many new facts and considerations, which throw light upon several important problems in mineralogy and geology. The price of this book is \$5.

A MONSTER WAGON.—What is without doubt the heaviest wagon ever made, was built lately by the Miller-Knoblock Wagon

Co., of South Bend, Ind., and was consigned to the Cleveland City Cable Ry. Co., of Cleveland. Its weight is 9000 lbs., and its guaranteed carrying capacity 100,000 lbs. or 50 tons. It is intended for use in transporting cable reels or spools, containing long lengths of street car cable, from the depot to the power house.

In the Line of Friendly Policy.

The current issue of the MINING AND SCIENTIFIC PRESS comes to hand full of good things for mining men. In its columns we find an article in defense of George Ohleyer, who has long been regarded as a personal enemy by many mining men. The PRESS declares that Mr. Ohleyer is fairer minded than he has been given credit for, but admits that he is a man of strong prejudices. This seems to us inconsistent, but if Mr. Ohleyer will only let up on us and be real nice, we'll call him a gentleman, a scholar and a good judge of whisky.—Nevada City Herald, February 9th.

The article referred to in the above paragraph was not intended as any defense of Mr. George Ohleyer, nor was there any inconsistency in our remarks about his being perhaps fairer minded than he had been given credit for, and at the same time stating that he was a man of strong prejudices. The reason of his apparent fairmindedness was given—favoring a hydraulic mining resolution introduced at the committee meeting of the River Improvement Convention by John B. Hobson.

We wrote the article in question in a spirit of fairness toward a leader of the men who had always been opposed to mining, but who have now joined hands with us in a common cause. It was represented in the newspapers that Mr. Ohleyer had gone off ahead of time as an agent of the Anti-Debris Association to Washington, and would injure the miners' cause if he could. He did not go as an agent of the Anti-Debris Association, but as a delegate of the River Improvement Convention. He did not go secretly or ahead of the time set for him, but went as he was told to and at the time appointed, and we thought it proper, as far as we were able, to correct the popular error, so that the miners would understand the situation as it actually existed.

The MINING AND SCIENTIFIC PRESS does not believe in misrepresenting anybody, friend or enemy. While the writer does not profess to be an admirer of Mr. George Ohleyer, or his previous course toward the miners, it must be remembered that Mr. Ohleyer was a paid employee of the Anti-Debris Association, or so understood to be, and naturally had to earn his salary. Under these circumstances, it is hardly probable that he cares especially to see any movement which might take that association out of business. At the same time, when he went to Washington he did so for another body, the River Improvement Convention, which has officially entered into an amicable agreement with the representatives of the State Miners' Convention, and we are assured that Mr. Ohleyer will be governed by the policy of the body which sent him. Whether he personally likes this policy is another question; but he is sure to be bound by it, and, in fact, was promptly informed that he must be.

While Mr. Ohleyer has long been considered as a personal enemy by mining men, as the *Herald* states, it may be remarked that the same is true of many other men, who are now, through the result of the State Mining Convention, acting in a friendly spirit and lending their assistance to the miners' cause. We want to see this amicable understanding perpetuated. There has been enough conflict and misrepresentation. Our article on Mr. Ohleyer was not intended as a defense of him personally, but was simply in the line of the friendly policy adopted by miners and farmers, to which we agree with all heartiness. It was not right to let the impression prevail that the Anti-Debris Association, the River Improvement Convention, or Mr. Ohleyer, were trying to take unfair advantage of the miners, when such was not the case.

Patent Tricks—Old and New.

Some time ago, under this heading, we briefly explained some of the methods practiced by sharpers upon unsuspecting patentees, for whose benefit we will now repeat our remarks and make a few additions.

When an inventor receives a patent, his name is immortalized in the *Official Gazette*, and he immediately becomes the object of attack from a horde of hungry aspirants for money, among whom are ex-clerks, patent brokers, and pretended legal lights of varying degrees. The patentee is deluged with circulars and letters from this class of gentry. Some write to inform him confidentially that his patent is good for nothing; but on receipt of a certain fee they will set it right and make it sound as a silver dollar. Others pleasantly inform the new-fledged inventor they have read his patent with great pleasure; consider it to be a very valuable invention; if properly introduced, much money can be soon realized. The State of Iowa, they say, is worth \$50,000, Ohio, \$45,000, Pennsylvania \$65,000, and so on. All that is necessary is to print some circulars and do a little blowing, which the broker generously offers to do on receipt from the inventor of ten to fifty dollars cash in advance. Another writes to say he has an actual offer of \$10,000 for the patent in Canada, provided the patent is at once taken, which he will procure on receipt of the necessary money. It is almost needless to suggest these schemes are designed to fleece the inventor. The so-called patent sellers rarely effect a *bona fide* sale. They depend upon the advance fees obtained as above for a livelihood. Some of them have thus grown rich and prosperous.

These pretended sellers try to make it appear they are reliable by giving respectable references, and cite names of patentees for whom they purport to have sold patents. One mode of procuring these references is as follows: They write the patentee they have a customer who will buy a county right in Minnesota for \$500, and pay by deeding 25 acres of land in Arkansas, really worth \$1000, but the parties are so anxious to obtain the patent right they are willing to let the land go, and take the right in settlement, provided \$50 cash is paid and a mortgage is given for \$500. This done, the patent broker closes the transaction, receives the \$50 cash, which is the full value of the land, also receives a mortgage for \$500, together with a patent deed. At the same time the broker is careful to obtain a written certificate from the inventor stating, "I take pleasure in saying that X. Y. Z. & Co. have sold a patent right for me, at my price and on terms satisfactory, and I recommend them, etc. In this way references are secured which make quite an impressive show on circulars, while the inventor is so ashamed of having been so easily duped, he keeps mum.

One of the latest tricks is the following: The patentee receives a letter from A. & B. asking for how much he will sell his patent for such and such a State. He replies, giving a price, say \$5000. The patentee soon after receives another letter from X. Y. Z., saying that A. & B. write they have corresponded with you, and now say they have decided to purchase the patent on the terms named, provided the title and claims are found to be correct. To ascertain this, they require that X. Y. Z. shall examine and report upon the patent, otherwise A. & B. will not purchase; that if the patentee wishes to complete the sale he must remit \$50 to pay for the examination, which is a work independent of the sale, and must be independently paid. The inventor sends the money; a report is made adverse to the patentee, no purchase is made, none was ever intended.

A new edition of the same class of swindles is worked by a gang of confederates as follows:

One of the swindlers writes to the patentee asking if the patent has been disposed of. If not, he would like to correspond with a view to purchase or manufacture. Reply is made that the patent is for sale. Then comes another letter from the swindler, saying substantially, "We have examined the invention very carefully, and if you will furnish us with an opinion or report as to the scope or validity of your patent we will, if same is satisfactory, make you an offer either for purchase or license on royalty. Our proposition will be based entirely on the nature of the opinion or report. If you have not already a reliable opinion, we recommend D. & Co. (Diddlem), as moderate in charges for this class of work. Such patent rights as we buy must be bought at once, and it will therefore pay you to furnish the report without delay." The inventor then writes to the other members of the gang, Diddlem & Co., by whom the inventor is requested to send \$50 or \$100 cash and the desired report will be furnished.

Unsuspecting inventors easily fall victims to this trick; the money is paid, and the tricksters, who never had any idea of buying the patent, divide the plunder.

The patent insurance dodge is another scheme for relieving inventors of their cash. This purports to be a corporation for insuring inventors against infringements. By paying \$8 cash within 30 days of the issuance of the patent, the concern undertakes to insure the patentee for one year against any infringement of his patent by other people, besides giving advice and services for which other lawyers charge anywhere from \$250 to \$10,000. There is less chance of infringement during this period than that the inventor will be struck by lightning in winter. This is simply a scheme to do the inventor out of \$8.

A French trick played with much success on American inventors is the following: The new patentee receives by mail, from Paris, a flaming ornamental document of provisional membership, which looks as if it came officially from the president of the famous Academy of Sciences, with a letter informing Monsieur le John Smith of Snuffkinsville, Arkansas, Republique des Etats Unis, that the Academy has observed with pleasure his invention for planting seeds, so important for agriculture; in view of which they have voted to confer upon M. le Smith the honorable distinction of membership in the Academy. M. le Smith will have the goodness to remit to the treasurer the nominal sum of 50 francs—ten dollars—to defray the cost of the parchment, framing, boxing and transportation of the diploma. These tricksters are said to draw considerable money from the United States.

Such are a few of the adroit schemes now in vogue for swindling "innocent" inventors.

Bills have been introduced in Congress to protect innocent purchasers of patents, i. e., infringers. Might it not also be well for somebody to formulate a law to protect innocent inventors?—Scientific American.

Minerals and Townsites.

It was an interesting case that Secretary Noble decided, involving the town of Iowa Hill, Placer county, Cal. It was the case of B. F. Myers vs. John B. Hobson et al., involving a mineral application for land in Sacramento district. The Commissioner's decision in holding Hobson's mineral application for cancellation is reversed by Secretary Noble. He says Hobson et al. should be allowed to make entry for the tract. Hobson, in 1887, made a mineral application for the Excelsior placer mine. It had once been embraced in the Central Pacific Co.'s selections, but was cancelled on account of the existence of minerals, in June, 1887. B. F. Myers, Superior Judge of Placer county, as ex-officio trustee for the inhabitants of Iowa Hill, filed an application for patent to the fractional northwest quarter of said section 33, alleging that the land was more valuable for agricultural purposes and for the purposes of residence, trade and business than for mining purposes. After a hearing the Register and Receiver found that the land in question possessed but little or no value for agricultural or for municipal or residence purposes, or as a townsite, but that it possessed positive and high value for mineral purposes. The Commissioner reversed this decision and an appeal was taken to the department.

The Secretary says the town of Iowa Hill has been in existence since 1854, and soon after mining operations began in Placer county. The town once had more than 1000 inhabitants, but at the time of the trial only about 150, of which only 30 resided on the tract in question. The majority and the better class of citizens lived on land adjoining this tract, and knew nothing of this townsite application, and were opposed to it. The land had a positive value for its minerals. Thousands of dollars have already been taken from this ground. Some of the townsites witnesses testified that the tract is not valuable for mining purposes, but their opinions are mainly based upon results obtained in former years. The failure to obtain good returns from hydraulic works 30 years ago is no criterion of present value of mineral land, with the present improved machinery. Cheapened supplies have increased the knowledge of mining, etc.

CHEMISTRY OF A TEAR.—The chief element in the composition of a tear is water, but with water is associated minute proportions of salt, soda, phosphate of lime, phosphate of soda and mucus, and when seen under a microscope, a tear after evaporation looks like a very small fish bone, owing to the salines forming themselves into lengthened crosslines.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ed.

Cortez District.

Occurrence and Distribution of Ore Bodies in Nevada.

SAN FRANCISCO, Feb. 15, 1892.

TO THE EDITOR:—In the last annual mining review of the *Chronicle* occurs a statement calculated to arrest the attention of both the prospector and the geologist, this statement being to the effect that the ore deposits of Nevada are found not only scattered quite evenly over the entire area of the State, but that such of them as have partaken of the character of bonanzas are located near its center or midway its borders on either hand and in the directions of the cardinal points of the compass.

In support of this statement, the writer calls attention to the fact that the Comstock mines are situated on the western verge near the middle of the State, being confronted by the Pioche district, lying directly to the east and close to the Utah line, while midway on the north we have the Tuscarora mines, opposed by the Candelaria group lying opposite and far to the south, the Austin and the Cortez mines being near the center of the State.

But besides the singular position of these bonanza deposits, we are reminded that the metalliferous veins of Nevada have a wide and equable distribution, there being not a county in the State but contains many valuable deposits of this kind, this being more than can be affirmed of any other State lying west of or adjacent to the Rocky mountains.

Of these more notable and largely productive mines nearly all have had a remarkable history, none more so than the Cortez group, situated in Lander county. In the fall of 1863 a company of prospectors, of which the writer was one, set out from Austin to explore the country to the north. Traveling in that direction about 60 miles, they came into a region abounding with silver-bearing lodes. Here they camped and proceeded to organize a mining district, which they named Cortez. This done, a great number of claims were taken up and recorded; also, a goodly area of the scrub pine forests and several small springs found in the neighborhood. After tarrying in the district for a short time, the party returned to Austin and there separated, each man going his own way, it being deemed too late in the season to undertake any improvements in that remote and forbidding section of country.

Of this pioneer party not more perhaps than three or four ever returned to Cortez. Of the few who went back was Simeon Wenban, he being the only one who kept up his assessment work and permanently remained. Although his means were limited and he never received much outside assistance, Wenban managed not only to stay but succeeded, after a struggle extending over a number of years, in partially opening some of his claims and getting a small mill on the ground.

With the earnings of this mill, never large, he contrived to defray current expenses and also keep work going on a tunnel designed to more thoroughly prospect his ground. This tunnel proved at last such a strain on his slender finances that he was compelled to suspend work upon it. Putting in a last shot before doing so, a body of ore was broken into which afterward proved to be of high grade and great extent. This good luck came to our miner only after many years of deprivation, hardship and toil.

The newspaper accounts of this event have not always been correct, some of them representing Wenban to have been at the time abjectly poor and so discouraged that he was about to give up and abandon the field altogether. Though reduced to dire straits and burdened with debt, he never, however, entertained a thought of giving up the contest.

But these writers for the press were not to be blamed, Wenban being a man little disposed to talk about his private affairs. He hates notoriety, and, though communicative enough on other subjects, will not be interviewed concerning matters purely personal; wherefore, our scribes, in the absence of more exact information, were left to guess a good deal. Moreover, the paragrapher of the present day must cater to the popular taste. He must deal in striking antitheses and flavor his articles with a spice of romance—jerk the pauper from the poorhouse into a palace, converting him from a beggar into a millionaire in a single day. For this reason, these writers are to be excused when they

represent that one last shot as having lifted our hardy miner out of the slough of absolute destitution up on the delectable heights of enormous wealth, although he was at the time in comparatively easy circumstances and already in the way of achieving at least a moderate success.

The property now owned by Wenban in the Cortez district is valued at about \$7,000,000, these mines having produced to date a total of about \$6,000,000, net profits \$3,000,000. The output at present and which can probably be kept up for an indefinite period, is \$50,000 per month, made at a cost of \$18,000.

Time and again have we, who accompanied Wenban on his first trip to Cortez, been reminded of the fatal mistake we made in not returning and, like him, accumulating a fortune there. A terrible mistake it would have been to be sure, had we, who never went back, been constituted like him who did so, and accomplished so much. But here was the trouble, we were not so constituted; we had not the nerve, the will power, nor yet the power of physical endurance given to him. Wherefore, it was well that we never went back. Some of us have since succeeded tolerably well along other lines of endeavor, as well perhaps as our early confrere would have done had he worked in the same direction. In advising to any course of action, fitness and qualifications should be duly considered, otherwise what is intended to serve as a useful example may be perverted into a baleful illusion. Simeon Wenban, besides the possession of an iron constitution, is a man of great determination. His purpose once fixed is not easily altered. General Grant resolved to fight it out on his chosen line if it took all summer. Wenban did the same thing, knowing it would take a good many summers. H. D.

Petroleum in San Luis Obispo.

The Paso Robles *Moon* says:

One of the most important discoveries in the history of this county was made not long ago when oil was discovered this side of Cambria, on the Santa Rosa creek. The deposit promises well. The soil is very pregnant with petroleum which oozes out constantly. In some places the fluid may be seen in almost running streams. Indications point to an inexhaustible supply. A stock company was formed at once to develop the oil. The capital stock was placed at \$500,000, and was all taken in a short time. A. F. Benton, manager of the Eagle Ranch, of which Baron Von Schroeder is owner, is at the head of the vast enterprise. Nearly 8000 acres of land, on which the fluid is located, was leased for a term of 20 years, thus giving the projectors ample opportunity to develop the new industry.

Mr. Massey, one of the stockholders and superintendent, is now getting things in readiness preparatory to commence boring for oil. Some of the machinery is now on the ground. Development will commence as soon as the incorporation papers are filed, which will be in a few days.

This discovery will serve to show the many resources of San Luis Obispo county. In this connection, it is well to say that Myron Angel, while at the Miners' Convention last week, had the pleasure of explaining that San Luis Obispo county was richly stored with minerals; that we also mined gold in the La Panza; that we had mountains of bituminous rock, which makes the best pavement in the world; that our chief mountain range holds vast deposits of chrome which we send to Philadelphia and Baltimore chemical works; that we produce the most beautiful onyx ever seen; that we have oil, asphaltum, gypsum, alabaster, salt, sulphur, antimony, manganese, iron, copper, limestone and other minerals of value, and that we have many rich deposits of quicksilver which we will work when the hydraulic miners and other miners of the precious metals resume operations and give mining of all classes a standing and prosperity. But this new oil discovery promises to beat them all.

HOW IT EXPLODED.—An old prospector in this district, who does not want his name mentioned, has been in the habit of putting his powder in hot water to thaw. The other day he put some powder in a can of water and placed the whole thing on the forge fire. The same water had been used for the same purpose several times before, and had, naturally, absorbed considerable nitro-glycerine. When the water became heated, it exploded, blew the forge to the unknown, and tore the clothes clean off the corporeal form of the astonished prospector. He will never thaw powder in that way again, for he has learned that nitro-glycerine will not amalgamate with water and stand fooling with.—*Eureka Sentinel*.

Edison's Inventions.

Money from Manufacturing Rather Than from Patents.

Mr. Edison wrote down a list of his inventions, which, as he said, were his commercial inventions—that is to say, those which, by returning a profit, had proved their own success, says the *New York World*. This is the list, with his comments:

District Telegraph—Of that I am one-half inventor.

Quadruplex System of Telegraphy—That is my invention.

Stock Ticker—Of that I am one-half inventor.

Telephone—One-half my invention.

Electric Pen and Mimeograph—My invention.

Incandescent Lighting System—My invention.

Electric Railroad—I am one of the inventors of that.

Phonograph—My invention.

The district messenger service is in use in 600 cities and towns in the United States. The investment amounts to about \$4,800,000, paying about 5 per cent. The system employs about 30,000 persons, averaging \$1 a day salary.

The quadruplex system of telegraphy is in use on 72,000 miles of Western Union wire. Eleven years ago the Western Union reports stated that the quadruplex system saved \$560,000 in interest and repairs. Inasmuch as every mile of wire actually built does the work of four miles of wire, the quadruplex system represents 216,000 miles of phantom wire, worth \$10,800,000.

On these \$10,800,000 worth of wires there is no repairing to be done. The value of those phantom wires is therefore represented by a saving of \$860,000 in repairs at \$4 a mile annually, besides the interest on the \$10,800,000 which it would have taken to build them. Three thousand men work on my duplex instruments. I sold the system to the Western Union 16 years ago for \$30,000, and spent the whole of it in experimenting in trying to make a wire carry six messages instead of four. I didn't succeed, so that financially I am worse off than I would have been had I never invented the quadruplex system. The stock ticker employs about 500 men at work, and represents an investment of \$8,000,000, paying about 5 per cent a year. From that invention I have received at different times \$50,000. I spent \$60,000 in getting the thing up. That again was a loss.

Bell invented the receiver. That is the end of the telephone which you put to your ear. He was trying to use that simultaneously as a transmitter, but could not make it go. The thing, therefore, did not pay. I invented the carbon transmitter, which made the telephone a financial success by making it commercially available. Here are the financial figures on the telephone, which really stagger me, now that I come to look them up. Throughout the world there are at least one million telephones in use. They pay \$50,000,000 a year rental. They represent an actual investment of \$100,000,000 at least, capitalized at twice that sum and paying about \$10,000,000 a year profit. That invention of mine was a very good thing for the girls, which is a gratifying thought. It employs 20,000 people, mostly young women. I got for the telephone about \$102,000 in all. Taking out what I expended in experiments, I probably realized \$25,000 in clear profit. Bell made about half a million. Many people imagine that he made an enormous fortune, but he didn't. It was his father-in-law who made a vast fortune by getting control of much stock.

My electric pen and mimeograph duplicating apparatus is used very largely here and in Europe. Three hundred men make a living out of it. The profits on that are not large.

My incandescent light system is the most satisfactory to contemplate as regards the employment it gives to great numbers of men. Throughout the world, 36,000 men make a living out of that invention. In my shops at Schenectady, I employ 3800 hands; at my Harrison Lamp Works, 1000; in the New York Works, 150. About 4,000,000 lights are burning. These represent an investment in cold cash of \$100,000,000. I can count up \$87,000,000. In addition to that, customers have paid \$12,000,000 more for the installation of wires. The thing is capitalized, taking all the companies together, at about \$200,000,000, paying from 4 to 20 per cent a year. My patents on incandescent lights netted me about \$140,000. I spent about \$400,000 in experimenting.

The electric railway is, of course, not such a big enterprise. I built the first in the

United States at Menlo Park in 1879. It was three miles long, and on it I obtained a speed of 40 miles an hour. I sold it out long ago. I did not get my money back on it.

The phonograph is a new thing. It will take four or five years to pioneer it. It will be greater than the telephone. To pioneer a thing is to get it on its feet. It took 12 years to pioneer the type writer. Yes, I might invent an electric type writer, a noiseless one, but the thing is not pressing, as it is in very good condition now. I have sold the phonograph out, but about that there is a complicated story, which need not be told. I have made no money out of it, but there is one thing which I am now working on out of which I shall make money, and of which nobody can get any share except the boys here who own the thing with me. That is the magnetic concentration of iron ores. It is the latest commercial thing I have got up.

I have a mill at Ogden, N. J., with a capacity of 2000 tons in 20 hours. This is the idea briefly. Iron ore is not Bessemer ore unless it contains as little as a fifty-thousandth part of one per cent of phosphorus. If it has more phosphorus than that, it is brittle and cannot be used for making Bessemer steel. We are obliged, for our Eastern manufacturing interests, to import Bessemer ore from Algiers, Cuba, Spain, etc., as the freight from Michigan is too expensive. We import about 1,600,000 tons per year. New Jersey contains the largest strip or area of primal rock containing ore in the United States. There is probably more ore in this State in the primal rock than in all the rest of the States put together. The magnetic concentration of that ore will produce enough to supply the United States for centuries.

The process of concentration—that is, of extracting magnetically the small particles of ore from the rock in which it is scattered—makes it Bessemer ore of the highest quality by destroying the phosphorus in it. I have been for three years leasing all the available deposits of ore in New Jersey. I have secured 18 square miles of mineralized rock now. This will be for me a regular Standard Oil enterprise. In six or eight years I shall take out \$10,000,000 or \$12,000,000 worth of ore a year at a profit of about \$3,000,000 a year clear. I have now in contemplation eight mills.

From my various patents, so far as the patents themselves go, I have stood an actual loss in experimenting and in lawsuits of \$600,000. I should be better off if I had not taken out any patents. I do not mean to say that I am a pauper, as you might think from my talk, but my money has not been made out of patents or out of any protection that the Patent Office has given me. I have made it all in manufacturing, and I have made quite enough to pay for my experiments and to get a good living, which is all that I care about.

I have worked on as many as 40 machines at one time. An exhibition of all the machines that I have worked at and experimented on, if I had kept them, would cover about 25 acres.

LIDGERWOOD HOIST—A neat reminder of the Lidgerwood Manufacturing Company comes to our desk in the shape of a delicately tinted bevelled edge card, 7 x 8 3-4 inches, upon which is mounted a photograph of a new six spool Lidgerwood hoisting engine for bridge erectors. There is a brief description of the engine below the photograph. The card is designed to be hung upon a nail. The Lidgerwood six spool hoisting engine is portable, serviceable and thoroughly reliable, and is designed for use in bridge erection and in the construction of iron buildings. It can also be profitably used for hoisting heavy loads generally. It has six spools independent in action and each having a clutch, lever, ratchet and pawl. The absolute independence of the spools enables the engine to be operated to great advantage in bridge erection as several members of a truss or girder can be hoisted and held in position while they are being riveted. The engine has many other attractive features and the Lidgerwood Manufacturing Company will gladly reply to all inquiries concerning it, addressed to the New York office of the company, 96 Liberty street.

A NEW ELECTRIC ROCK DRILL.—The Electrical Engineering Company of 21 and 23 Spear street, in this city, have on exhibition their new electric rock drill. This drill, in its general construction, is quite similar to other drills of the kind, but has a number of improvements which are thought to render it superior to others. Mining men who are especially interested in such matters will do well to call and examine it. It will be found in operation from 10 A. M. to 4 P. M.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, Feb. 13: The mining prospects here continue to look more encouraging as the work of development proceeds. Good progress is being made in drifting south at the Wildman at the lowest level. The drift is run alongside of the ledge, and is being extended at the rate of about 12 feet per week, and the necessary distance from the shaft for crosscutting operations is almost reached. The ground passed through consists of boulders with a coating of lively looking gongee, which is regarded as an excellent indication. The Hector mine presents a more animated appearance than all the other mines combined, owing to the fact that the work is carried on exclusively on the surface. Powder is being used in abundance, and the constant blasting resembles a continuous cannonade of a Fourth of July celebration. At the Belmont, the 10-stamp mill is being run only during day time, and is supplied with ore from the main tunnel. In about 50 feet more, connection will be made with the boss shaft, and the mill will then be kept running day and night. At the Lincoln, matters have assumed something of a circus-like turn the past week. It appears that the mill has not panned out to the satisfaction of the parties interested. It is intimated that the stamps have been pounding away on stuff that failed to respond with scarcely more than the color of gold; although Mr. Smith, one of the best millmen in the county, was in charge of the mill. He was politely asked to step aside by the miners and one or two others financially interested, and so a general change in the milling program has taken place. Sinking at the South Eureka progresses in a satisfactory manner. Quartz has been met with from the commencement. The formation is considered favorable, and confidence is felt that in crosscutting, a good mine will be opened.

CLINTON CONSOLIDATED.—Ledger, Feb. 13: We are pleased to be able to state that the outlook for this property is very encouraging. They have sunk to a depth of over 300 feet, and twice during the past week have encountered exceedingly rich ore—the rock being studded with gold. We have not seen these rich specimens, but are informed that a small candle box of quartz was estimated to contain at least \$50 in gold. The rich vein is said to be five feet wide. The chlorination works are again running. D. Guttman, the superintendent, went below last week, to purchase a stock of goods for the company's store, which is expected to commence business in a short time. A petition is before the supervisors for the creation of a new school district at this place, so that, altogether, the prospects of the little town of Wieland are decidedly encouraging.

AMADOR QUEEN.—Operations have come to a standstill at this claim. Dr. Barde, who is chiefly interested, came up a few days ago, and wisely decided to put an end to the wild efforts at mining which have characterized the operations here for several months.

BAY STATE.—Sinking is progressing again, after a stoppage of two weeks, employed in cutting a tunnel and placing a pump in the shaft to drain off the surface water caused by the rains. The shaft is down 220 feet, and as the ground has become more favorable, better progress will be made, and it is expected to be crosscutting the ledge in three months. The financial status, under the economical management of Mr. Jones, is all that can be desired, there being funds enough in the treasury to more than pay off all indebtedness to the present time.

MORE STAMPS.—Twenty more stamps are to be added to the mill at Quartz Mountain in the spring. This will make 40 stamps in all. This steady increase of milling capacity is conclusive evidence that mining at this point has got down to a solid and prosperous basis. Other claims will doubtless be started up on the old mountain ere long. There is rock enough to keep several hundred stamps in steady motion for a lifetime.

Fresno.

GOLD ORE.—Fresno Enterprise, Feb. 15: Two mines, the Starlight and Riverside, are owned by Charles Ward and other persons. They are situated about one-half mile east of Grub Gulch, east of Madera, says the Mercury. The mines are rich in gold ore. The Starlight is down 120 feet, and men are working on the Riverside on a line between the two. The mines lie side by side and embrace a territory of 3000 feet. They were located by Mr. Ward two years ago, but active work was not begun until last spring. The surface ore pays from five to six dollars per ton. At the depth of 80 feet in the Starlight, rich sulphurets increase and more gold is encountered. In the next 60 feet the ore assays at \$15 per ton, and every foot farther the shaft is sunk the ore becomes more valuable. Aside from this splendid showing, quite a number of other mines in the immediate vicinity are constantly growing in favor, and in a recent strike made in a recent location, sulphurets were found that assayed as high as \$493. It is also reported on credible authority that miners have, for the past week or two, ground out as much as \$8 from rock per pound by means of an arrastre. The excitement has been suppressed on account of the rich find, and persons posted assert positively that there can be no doubt as to the discovery of the mother lode. Close to the Starlight and Riverside mines are the Josephine, Gambetta, Enterprise, Belmont, Pool, Swan and King's Gulch, the last named being the property of Thomas B. Cargile and others, of Madera. This mine is showing up splendidly and indications point to the owners having a fortune. About a year

ago, a Mr. Swain, a capitalist of San Francisco began tunneling into one of the veins leading into the mother lode. Working part of the time night and day, he has reached an exceedingly rich vein of ore four feet wide, 275 feet from where the tunnel commenced. He will shortly put up a large mill.

Nevada.

OMAHA MINE.—Grass Valley Telegraph, Feb. 12: Just at present the Omaha mine seems to have put on its spring attire and is about to declare another dividend. The dividends heretofore have been 15 cents per share, and while we speak without authority, it is safe to say that the coming dividend will come up to that standard, if not more. The dividend, if declared, will be payable on the 26th of this month.

HARTERY MINE.—Wednesday night the miners unearthed a good ledge on the Roach (Hartery Company) ground. The ledge as found is about ten inches in thickness, shows gold in every part of it, and every member of the company now feels in good cheer over the new find.

VERY RICH ORE.—Grass Valley Telegraph, Feb. 10: At noon to-day (Wednesday) Superintendent Mainhart of the Omaha mine brought to town some very rich ore just taken from the very bottom of the mine. The ore is full of the very best gold-bearing mineral, and shows free gold all through it. It may be seen at the Citizens' Bank.

PROSPECTING AN OLD LEDGE.—Years ago, in the early '60's, Dr. J. W. Kelley, Wm. Shepherd (now of Oakland) and others used to "ground sluice" out at Buena Vista. One day, while they were working in the drift on the bedrock, they came across a quartz stringer which looked very favorable. They followed the stringer until it developed into quite a ledge, and the ledge showed free gold in no mean quantities. As the miners were only bunting for gravel gold, no particular work was done on the ledge outside of taking out a few loads of rock, and that rock remains on the dump at present. A few weeks ago Dr. Kelley and others relocated the claim, and by a long search found the ledge. The country around the Buena Vista Slide has become so covered with underbrush and debris that it was no easy task to find the ledge discovered so many years ago. It was found, however, and a party of miners are now drifting on it.

GRASS VALLEY NOTES.—Union, Feb. 12: The shaft of the Central North Star mine is down 140 feet. The shaft of the Telegraph mine is down 180 feet, and is showing a good-looking ledge. The Pennsylvania vein is showing two feet in width at the bottom of the mine, carrying an excellent quality of ore. The prospects of the mine are considered very encouraging. The W. Y. O. D. Company has declared a dividend (No. 6) of 10 cents per share, payable on the 15th inst. There are plenty more dividends in sight. The California is looking well, and the mill is now running regularly. The working force of the North Banner mine has been increased of late and the mill is now kept supplied with ore. The developments in the Hermosa mine are being watched with much interest, owing to the late encouraging developments.

GRASS VALLEY ENTERPRISE.—Nevada City Herald, Feb. 15: We don't believe there is a town on the Pacific Coast where the people, one and all, take right hold of new mining enterprises as they do in our sister city, Grass Valley. Tradesmen, miners and mechanics all own stock in some mine. Operators are given a chance, the people respond liberally, and most of their speculation seems to turn out well. And that is what makes Grass Valley the leading town in Nevada county to-day.

SPENCEVILLE MINERAL PAINT.—Grass Valley Union, Feb. 14: Mr. O. A. Woehler, one of the proprietors of the Spenceville copper mine, was in town yesterday. He says that during the winter not much is done in the way of making copper, the summer being the best season for the product, in the way they operate. As to the mineral paint, which they make from the refuse copper ores, the demand has exceeded the capacity of their works to furnish a supply, and it is the intention to increase the plant during the coming season. The company cannot fill the orders as fast as they come in, but during the present year, the machinery will be amplified sufficiently to supply all orders that may come.

Placer.

A RICH STRIKE.—Placer Herald, Feb. 13: The Richey mine, in what is known as Dirty Ditch ravine, just back of the old Greenwood toll house, a little more than a mile south of Auburn, is said to be very rich. A tunnel has been run from the ravine into the hill, and whether they have struck a channel or whether it is an old slide from one of the banks, we believe is not positively known, but report says the gravel is paying at the rate of about an ounce a day to the man.

Santa Barbara.

ASPHALTUM DISCOVERY.—Santa Barbara Independent, Feb. 13: A firm of Santa Barbara gentlemen have leased and will at once begin to work a mine of asphaltum that experts pronounce the finest found so far. A few months ago Mr. Ernest Atkinson was down the coast prospecting. On the Mullen place, 1½ miles from Rincon bridge, he discovered an outcropping of very hard bitumen. It was the hardest he had ever seen, and at once he decided to develop it. A firm was formed consisting of himself, his brother Richard, Cesar Lataillade and a gentleman by name of Puffenberger. This asphaltum is the hardest known. It is about 30 per cent of pure bitumen, and will make a pavement that is well nigh indestructible. There seems to be an inexhaustible supply. Boulders of this material weighing from 7 to 11 tons are found along the creek. Owing to the easy access to the mine, the ease of mining and the ease of handling this new material, it can be laid down to our market at

a less cost than any other bituminous rock. Other rocks will run at from 13 to 16 per cent of bitumen. The rock is so hard that if reduced to fragments it can be shipped to any point without trouble. A big pile of it can be left in the sun, and yet when desired can be moved with no more trouble than it requires to move other rocks. It can be transported without "sacking." This is the most important mineral discovery in this part of the State for a long time. It places at our doors the finest pavement in the world at a price much beneath what other cities will have to pay. It is a very important discovery and will be another source of revenue to this city. A gang of men is at work all the time on the mine.

Sierra.

BALD MT. EXTENSION.—Mt. Messenger, Feb. 13: At the annual meeting of the Bald Mt. Extension Co., in Downville, Monday evening, Jan. 18th, the following named stockholders were elected Directors for the ensuing year: H. T. Briggs, J. W. Orear, H. H. Purdy, R. Forbes, S. B. Davidson. The gold yield for January was 454½ ounces—\$8,453.12. The prospects are very bright for the new year. The mine at Happy Hollow is still in the hands of Deputy Sheriffs. Mr. Chapman, the principal owner, is at the mine. It was understood that the indebtedness would be paid off as soon as Mr. Chapman came up, but there appears to be some hitch. Fourteen men are prospecting in Nos. 3 and 4 tunnels at the Young America. As water is scarce, the mill has ceased running, but will be started in the spring. Considerable good-paying ore is in sight. The prospects are very favorable for this noted mining property.

Siskiyou.

KLAMATH RIVER NOTES.—Siskiyou Telegram, Feb. 12: Although we have had a very severe winter, yet the river has been so that miners could have run continuously, had they wished. The amount said to have been taken out of the Bentz Bar claim this season is \$200,000. This mine was worked by a company of Chinamen. The Phil Mott claim at Virginia Bar has run almost all winter. They also have taken out a large sum. Indications seem to point to a very busy season along the Klamath. Should Messrs. Pardee, Cook & Co. start up the Klamath River Improvement Co.'s enterprise, it must be of vast benefit to producers, besides the large number of men and teams employed. The snow melting so slowly is largely absorbed by the ground, which in turn will feed the smaller streams a longer time and enable those mining on them to work on later in the season than otherwise. There is talk of the Buckeye Bar Co. putting in a second large wing dam and working two derricks. Their claim paid well the past season. Among the new enterprises in this section is one which has already assumed proportions almost justifying its success. A large number of practical mining men of several years' experience on this river and some of the leading business men and stock men got together to see what could be done toward forming an incorporated company. They met at H. J. Barton's store at Oak Bar. When the ground, which by the way lies just below Horse creek on the north side of the Klamath, was proposed, an organization was formed immediately, developing work having shown that the ground is rich. Stock has already been taken to the amount of \$8000 shares, Mr. Barton with his accustomed energy taking a large number himself. Such names as Messrs. F. Kohl, J. B. LeDuc, Geo. Jensen, F. Anderson, A. C. Snow, J. J. Walters and Conrad Lichens are a few which I was informed had interested themselves in the company. Of course, they will hold the right to acquire mining ground as they advance. A few more such companies on this river, and there would be less money sent to China.

QUARTZ.—Yreka Journal, Feb. 10: Quartz mining is now in full blast with good success on Humburg Creek, and all the companies are doing well. Boyle & Co., at the head of North Fork, are getting out rock that pays \$60 per ton. Spencer & Co. are working their ledge with a large force, the quartz yielding about \$100 a ton. Van Nader & Marion, at Old Craggy, are taking out \$20 quartz, with improving prospects. Fahl & Lawson have a good ledge on South Fork, which is extensive and pays \$10 a ton. Cartwright & Phillips, on North Fork, have a ledge which pays \$40 a ton. Henley & Farish, at Rider Gulch, are taking out \$20 quartz. Rabbits & Hart, working a ledge near the forks of Humburg, are getting \$20 quartz. A man named Shefton, from below, has started up work on the Siskiyou ledge, the quartz from which is now being crushed at McCook's mill. Wm. Clark, opposite the Siskiyou, has also commenced taking out quartz, with good prospects. Harris & Keaton, at work above the Siskiyou, are realizing \$14 quartz. The McCook mill is kept running steadily, with plenty of custom crushing engaged ahead to keep the mill in constant operation.

Tuolumne.

GOLDEN GATE.—Tuolumne Independent, Feb. 13: The workmen at the Golden Gate mine struck last Sunday, as they had not been paid for two months. They demanded their pay and threatened to attach the property unless the money was forthcoming. The mine is being profitably worked, and there is money enough to meet all liabilities. A receiver was appointed by the San Francisco Court. When the case was transferred to Tuolumne county, a receiver was appointed by the court here, but he was not sure that he had the right to act until the other receivership had been disposed of, so the bullion produced at the mine passed into the hands of a receiver, but no one seemed to be willing to assume the risk of paying the accruing debts. The miners were paid their December wages last Sunday, and agreed to work a little longer. Their wages for January will be due the 15th of February. It is hoped

that the bills will be paid and that the mine will continue to be operated, as it is a paying property, of great benefit to the county.

BONANZA MINE.—The sale of the machinery of the Bonanza mine took place last Monday. Most of the machinery was purchased by Johnson, Oliver, Harriman and Keil, all of whom are owners of the mine. The sale, one of the partners tells us, has no bearing on the working of the mine. No information could be gained as to the probability of settlement of legal matters and a reopening of the mine on the lower level.

Trinity.

NUGGETS.—Rohnerville Herald, Feb. 13: A correspondent from New River says that Steve Noble and son came down from Pony creek recently with \$70.50, the result of two days' work. It was in nuggets, weighing from \$2 to \$35.75. The writer remembers the time when Steve Noble and his working companions took from a "pocket" in the bedrock on (we believe) Pony creek, a flat-iron shaped nugget of gold, weighing nearly \$230. That was about midway in the '60's.

NEW DITCH.—We learn that there is talk of digging a 16-mile ditch to afford water for the lower Trinity gravel mines; it is to tap the North Fork of the Trinity.

Yuba.

BROWN'S VALLEY PROSPECTS.—Marysville Democrat, Feb. 13: The winter weather has been favorable to the conduct of mines at Brown's Valley, and there has been good progress made. At the claim of Hibbert & Burris, just north of town, they have a 25-horse power engine at work with pump and hoisting apparatus, and the shaft is now down 110 feet, where they have already taken out about 150 tons of good quartz rock for crushing. Mr. Burris believes this quartz will average not less than \$30 or \$40 per ton, and they will build a mill this spring and expect to have it crushing and turning out gold in a few months hence. The Jefferson mine company have their main shaft down about 35 feet and are working six men daily in sinking, besides the engineer who attends to the hoisting works above ground. They have a good prospect in the ledge and believe the work will pay from the first when they get in position to take out quartz to advantage, and will also erect a mill for crushing it at an early day.

NEVADA.

Washoe District.

ANDES.—Virginia Enterprise, Feb. 13: North drift from east crosscut No. 6 on 420 level was advanced 25 feet, continuing in quartz. West crosscut from north drift from east crosscut No. 4 was extended 20 feet; formation, quartz of low assay value.

BULLION.—The joint east crosscut on north line, 1500 level, is out 63 feet; face, porphyry. The east crosscut, 120 feet south of north line, 1500 level, is out 53 feet; face in porphyry and streaks of quartz.

POTOSI.—The east crosscut from Potosi winze station, 1500 level, is out 102 feet; face in hard porphyry. The joint east crosscut on south line, 1400 level, is out 159 feet; face in porphyry. The upraise from 1230 level is connected with the 1130 level.

CHOLLAR.—The 1610 level west crosscut on north line is out 146 feet; face in porphyry. The south drift from above crosscut was advanced 31 feet; total length, 56 feet; face in low-grade quartz and porphyry. The east crosscut, 70 feet south of north line, 1500 level, was advanced 73 feet; total length, 103 feet; face in porphyry.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 430 feet; face in gypsum and quartz.

OCCIDENTAL.—North drift, 750 level, is in 257 feet; face in quartz and porphyry. At a point in the south drift, 750 level, 350 feet from the winze station, have started an east crosscut in quartz and porphyry, giving low assays.

UNION.—The joint Sierra Nevada and Union west drift, 900 level, is out west of shaft, 1660 feet; face in porphyry and streaks of quartz. The Union south lateral drift, 1570 feet west of shaft, 900 level, is out 143 feet; face in clay and porphyry.

EXCHAMBER.—East crosscut, 150 feet south of north line, 600 level, is out 277 feet; face in porphyry. The joint southwest drift, 1800 level, is in 1090 feet, the last six feet in ledge matter showing bunches of quartz yielding low assays.

ALPHA.—The only work done at the Alpha shaft during the week has been repairing the 500 and 600 stations. Southwest drift from the Ward shaft, 1800 level, is out 1090 feet. The last six feet is in ledge matter showing bunches of quartz yielding low assays.

WARD COMBINATION SHAFT.—The southwest drift, 1800 level, is out from shaft 1090 feet—the last six feet in clay and porphyry and bunches of quartz yielding low assays.

NEW YORK.—The west drift from the shaft, 650 level, is out 420 feet; face in porphyry. During the past week, work in the north drift, 650 level, has been confined to repairs. The raise in No. 4 west crosscut, 650 level, is up 4 feet; top in quartz showing bunches of good ore.

SIERRA NEVADA.—The joint Sierra Nevada and Union west drift, 900 level, is out west of shaft, 1660 feet; face in porphyry and streaks of quartz. The north drift is out a total distance of 582 feet; face in porphyry.

CONS. CALIFORNIA AND VIRGINIA.—There has been extracted from all parts of the mine during the week 1019 1440-2000 tons of ore, which was shipped to the Morgan mill. The average assay value of all the ore worked at that mill during the week (980 tons) was \$28.50. Bullion shipped to Carson Mint, assay value, \$12,300.

Willow Creek District.

GOON ORE.—Silver State, Feb. 15: Peter Roberti, who arrived from Willow Creek yesterday, showed us some ore from a prospect

which he is developing in that district. The claim is situated in Eagle canyon, a short distance below the Ohio mine, and was but recently discovered. Little work has been done on it as yet, but nevertheless the ledge shows up strong, and assays of the ore run up to over \$100 in gold. The claim is owned by Dr. Hanson of this place.

Tuscarora District.

NEVADA QUEEN.—*Times-Review*, Feb. 12: Second level—Work in No. 1 south drift was suspended while starting No. 2 raise, which has been put up 20 feet, cutting into the vein at 7 feet, exposing 12 inches of very high-grade ore, assaying \$150 to \$700 per ton. Above this stratum is low-grade ore, assaying \$3 to \$27 per ton. Work has been resumed in the face of drift, and raise will be put up to hanging wall.

DEL MONTE.—Third level—No. 1 north drift has been extended 19 feet, cutting into the hanging wall side of the vein, exposing 8 inches of ore assaying \$55 per ton.

NORTH COMMONWEALTH.—Second level—West drift from No. 1 crosscut advanced 19 feet, small seams of ore in the face of the drift. No. 1 raise from west crosscut, progress 20 feet in the vein, in low-grade ore. Stopes above the level east from winze, produced 5 tons, \$285 per ton assay value, and 67 cars 2d class, \$47 per ton.

NORTH BELLE ISLE.—No. 4 north drift, south 500-foot level, extended 8 feet. The ground swells badly and requires timbering. Hoisting at the upper works will be suspended for the present. Hoisted 33 cars of second-class ore.

BELLE ISLE.—No. 1 winze, 200-foot level, extended 5 feet. The crosscut from No. 1 vein, 350-foot level, extended 6 feet, cutting a small vein of good ore. No. 1 winze on No. 3 vein, same level, extended 18 feet. Hoisted 4 cars second-class ore.

NAVAJO.—South intermediate drift below the 350-foot level, extended 2 feet. The work has been delayed by repairs on the hoisting engine.

ARIZONA.

THE COPPER KING CO.—*Solomonville Bulletin*, Feb. 13: Although not much has been said in the newspapers about the mining operations of the Copper King Mining Co. at Oro, four miles above Clifton on the San Francisco river, they have been extensive, thorough and satisfactory to all concerned. The development work done on the several claims, located two miles up the mountain from Oro, has shown what will evidently become one of the best-paying mining properties in that section. A 40-ton smelter was erected at Oro a little over a year ago, and since then several short runs have been made, turning out \$55,000 worth of hullion, the ore being hrought down from the mine over a rough trail on the back of burros. The ore is a high-grade copper, and the quantity is practically unlimited. The mines are located in what is known as a granite formation, and the elevation is 5000 feet above the San Francisco river. On the various claims there has been done about 4000 feet of tunnel, drift and shaft work. On the Union No. 2, at the upper terminal of the tramway, two tunnels have been run into the mountain following the vein. In the lower tunnel a tramway has been laid which leads to the ore platform where the smelter tramway buckets are loaded, and all the ore from this mine will be carried out through this tunnel. On the mine known as Union No. 1, a tunnel has been run in on the vein 220 feet, connecting with a shaft 160 feet deep, and another shaft is also being sunk on the lower end of this claim. The mines of the company also include the Weist or Greenlee group, on which a large amount of development work has been done. The width of the vein in Union No. 2 is 16 feet, with walls as perfect as the side of a plastered room and almost as perpendicular. The vein matter is 7 feet wide with an ore streak 9 feet wide. The work done on these mines has been with a view to making easy work in the future, and as a result there will be no necessity to lift the ore from the time it is shot out of the mine until it is dumped from the tramway buckets into the concentrator or smelter.

COLORADO.

CRIPPLE CREEK AND CREEDE.—*Mining and Scientific Review*, Feb. 15: The expectation of those familiar with the ground at Cripple Creek and Creede, is that when the snows disappear and prospectors are enabled to work intelligently, some wonderful revelations will be made. They had but just made a beginning last year when winter came on with unusual severity. No prospecting of consequence has been done in either district since last October. Many hundreds have gone in those districts prepared to await the time when they can begin systematic explorations. If we are favored with an early spring, which now seems probable, work will be pushed with unprecedented force, and upon the results achieved will be measured the prosperity and progress of all Colorado for the next five years. We predict a very large increase of population, and with it a renewal of growth in all the principal towns. One of the better features of these numerous strikes lies in the promised material increase of the output of gold. This metal seems to predominate at Cripple Creek, and also in the Boulder discoveries. In view of the low price of silver, which appears to be steadily declining, each new revelation of gold-bearing ground will be hailed with rejoicing. We have an idea, a sort of presentiment, that the region above Manitou and Green Mountain Falls will be found to contain great quantities of the yellow metal. Certain indications of its presence have already been brought to light, but owing to the depth of snow and the frozen soil, scarcely anything more than surface prospects have been realized, but the plans are formed for a thorough exploitation of those sections as soon as the weather will permit.

We are, unquestionably, on the eve of one of the most prosperous years in the history of the State. It is not shadowy, vague and uncertain, but as positive as anything can be. Our reliance is not upon the great mines of Creede, but upon a dozen other sections that offer equally favorable conditions.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING FEB. 9, 1892.

463,555.—ADJUSTING DEVICE FOR CABLE GRIPS, Anderson & Fairchild, S. F.
468,540.—ORE SEPARATOR—Henry Cane, Spokane Falls, Wash.
463,765.—CAR COUPLING—F. A. Fox, S. F.
468,655.—MACHINE FOR ROLLING HOLLOW RODS—J. S. Griffin, Roslyn, Wash.
468,658.—PENCIL ATTACHMENT—J. H. Hamill, Globe, Ariz.
468,344.—STUMP PULLER—A. Hopkins, Centralia, Wash.
468,544.—CRUSHING MILL—F. A. Huntington, S. F.
468,664.—FILTER—E. M. Knight, S. F.
468,665.—CARPENTER'S SQUARE—L. C. Labady, Tacoma, Wash.
468,430.—WHEEL PUMP—Thos. Powell, Stockton, Cal.
408,364.—BOOT CLEANER—J. B. Prickett, Forest Grove, Or.
468,694.—PROPELLING VESSELS—J. M. Robinson, Vacaville, Cal.
21,338.—DESIGN FOR KEY TAO—C. McIntosh, Tacoma, Wash.

The following brief list by telegraph, for Feb. 16 will appear more complete on receipt of mail advices:

Allen S. Brown, Los Angeles, Cal., ventilator and drip tray; Joseph Brumbaugh, Gold Hill, Oregon, ore crusher; John Downs, San Francisco, sewer gate; George W. Forbes, Guberville, Santa Clara county, cultivator; John H. Howard, Pasadena, cooking steamer; Edmund R. Mallett, San Francisco, swimming apparatus; Kelly McFarland, Clackamas, Oregon, coupler for caps and fuses for giant powder; Adolph Somer, Berkeley, viscid fatty compound; George A. Stevenson, Los Angeles, elevated railway structure and double traction motor for elevated railways; Charles W. Tremain, Portland, Oregon, steam stamp; Houghton Sanger, S. F., electric arc lamp; A. J. Painter, Pasadena, Cal., motor for street cars; L. A. Steiger, San Jose, Cal., interlocking brick paving blocks; Frank Walker, Los Angeles, Cal., automatic flushing apparatus.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CRUSHING MILL.—Frank A. Huntington, S. F. No. 463,544. Dated Feb. 9, 1892. This is one of that class of crushing mills in which swinging rollers are revolved within a pan and are swung outwardly by centrifugal force against an encircling ring-die. The invention consists, in connection with a pan and rollers therein, of means for imparting to said rollers a positive axially rotary motion, whereby the rollers, by contact with the pan, are caused to travel around therein. The object of the invention is to avoid any tendency of the rollers to slip and thus to prevent unequal wear upon the surfaces of their shoes. This object is attained by the positive rotary motion imparted to the rollers, whereby they cannot slip against the ring-die, or mass of ore between them and the die, but are made to rotate under all circumstances.

ADJUSTING DEVICE FOR CABLE GRIPS.—Clarence L. Anderson and George H. Fairchild, S. F. No. 463,555. Dated Feb. 9, 1892. In the grip mechanism employed on cable railways, removable shoes are usually employed to grasp the cable, and as these shoes become worn it is necessary to employ some means for setting the parts nearer together, so that the grip of the shoes upon the cable will be properly maintained and the throw of the lever, by which they are operated, will remain essentially the same in all conditions of the shoes. This adjustment is usually made by means of a screw which is situated below the floor of the car upon which the grip is carried, and it is thus necessary for the gripman to reach down below the floor from time to time to make the necessary adjustments. The object of this invention is to enable the gripman to make these adjustments from some point above the floor or the quadrant rack. It consists of a mechanism whereby the wear of the grip-shoes may be compensated for by a take-up device, so that the shoes will always have the proper grip upon the cable, whether new or nearly worn out, or when the grip is used upon cables of different sizes.

Our Agents.

J. C. HOAG—San Francisco.
R. G. BAILEY—San Francisco.
GEO. WILSON—Sacramento Co.
J. H. CROSSMAN—San Diego and San Bernardino Co's.
FRANK A. SWEETSER—Colusa Co.
SAMUEL B. CLIFF—Creston, Cal.
S. A. DOYLE—Santa Clara Co.
A. C. GODFREY—Oregon.
MRS. BRUCE B. LEE—Tehama Co.
W. K. WIDEL—San Joaquin Co.
A. H. ALFORD—San Joaquin Co.
J. H. STAFFORD—Fresno Co.
DON E. ABBOTT—Santa Barbara and Ventura Co's.

The California Miners' Association.

Officers, Committees and Constitution and By-Laws of the State Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized. The officers of the Association are as follows:

HON. J. H. NEFF.....President.
W. C. RALSTON.....Secretary.
THOS. R. EVERETT.....Ass't Secretary.
H. PICHOR.....Treasurer.

VICE-PRESIDENTS.

NAME.	COUNTY.
R. F. Grigsby.....	Napa
Henry Martin.....	Trinity
Geo. W. Thomas.....	Marin
Frank R. Welsch.....	Sierra
Woolston Baugbart.....	San Mateo
R. H. Campbell.....	Siskiyou
Jas. O'Brien.....	Yuba
Frank Fitzgerald.....	Inyo
A. B. Call.....	Amador
Dixon Brabban.....	Plumas
J. F. Ryan.....	Humboldt
Aaron Bell.....	Shasta
H. O. Harvey.....	Sacramento
D. K. Perkins.....	Butte
A. M. Hardie.....	San Luis Obispo
A. Tregidgo.....	Nevada
Ex-Gov. H. G. Blaisdell.....	Alameda
T. B. Morse.....	Calaveras
Hon. A. M. Clark.....	Fresno
Hon. J. K. Luttrell.....	Sonoma
J. J. Crawford.....	El Dorado
R. M. Folger.....	Mono
Geo. F. Hoyt.....	Orange
R. McMurray.....	San Francisco
W. S. Chapman.....	San Francisco
J. C. Stump.....	San Francisco
C. T. Lacy.....	San Francisco
A. J. Ralston.....	San Francisco
John W. Maxwell.....	Tuolumne
Hon. R. Clark.....	Colusa
C. F. Reed.....	Placer
Chas. Bogan.....	Mariposa
James H. Lawrence.....	Merced

EXECUTIVE COMMITTEE.

Hon. J. H. Neff, Placer.	H. A. McCrancy, Lake.
Louis Glass, San Francisco.	Jas. Tunstead, Marin.
Col. Dan M. Burns, S. F.	A. M. Bryant, Mono.
Col. F. McLaughlin, Butte.	W. K. Alderley, Napa.
S. K. Thornton, S. F.	Chas. Bogan, Mariposa.
Wm. Irelan Jr., S. F.	Jas. H. Lawrence, Merced.
Hon. C. W. Cross, Nevada.	Hon. J. M. Walling, Nevada.
Chas. G. Yale, San Francisco.	D. C. Fixley, Oage.
J. B. Hobson, Placer.	John Spaulding, Placer.
Hon. Edw. Coleman, Nevada.	W. W. Kellogg, Plumas.
Hon. A. Waltham, S. F.	M. M. Drew, Sacramento.
Hon. J. K. Luttrell, Sonoma.	Thos. R. Church, S. F.
Ex-Gov. H. G. Blaisdell, Alabama.	John Hays Hammond, S. F.
Hon. Jno. Daggett, Siskiyou.	Myron Angel, S. L. Otisop.
Hon. E. O. Voorheis, Amador.	N. J. Brittan, San Mateo.
E. W. Fogg, Butte.	George M. Finney, Sierra.
John E. Davis, Calaveras.	R. G. Hart, Shasta.
John Boggs, Colusa.	A. W. Dana, Sonoma.
Hon. Thos. Fraser, El Dorado.	A. Hewell, Stanislaus.
Mr. McDonald, Fresno.	C. P. Berry, Sutter.
W. H. Pratt, Humboldt.	C. McTarnahan, Tuolumne.
Hon. Patrick Reddy, Inyo.	G. C. Kimball, Tehama.
J. O. Miller, Kern.	John McMurray, Trinity.
	G. G. Mayo, Yuba.

FINANCE COMMITTEE.

Louis Glass, San Francisco.	Edward Coleman, Grass Valley.
Wm. Irelan Jr., S. F.	S. K. Thornton, S. F.
N. J. Brittan, San Mateo.	John Hays Hammond, S. F.

COMMITTEE TO FORMULATE AND PROMOTE THE ADOPTION OF AMENDMENTS TO MINING STATUTES.

Hon. Niles Searles, of Ne-J. M. Fulweller, Placer.
vada.
Hon. C. W. Cross, S. F.
Hon. J. K. Luttrell, Sonoma.

COMMITTEE OF CONFERENCE WITH RIVER AND HARBOR CONVENTION COMMITTEE.

R. G. Hart, Shasta.	Wm. Irelan Jr., S. F.
Frank McLaughlin, Butte.	J. B. Hobson, Placer.
Hon. J. K. Luttrell, Sonoma.	

DELEGATES TO WASHINGTON.

Hon. Niles Searles, of Nevada County.
Hon. J. K. Luttrell, of Sonoma County.
Robt McMurray, of Nevada County.
J. B. Hobson, of Placer County.

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

SEC. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of this organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of eleven members selected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

SEC. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

SEC. 3. The President and Secretary of the Association shall be ex officio President and Secretary of the Executive Committee.

SEC. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of the Association.

SEC. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein prescribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

SEC. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall render annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

SEC. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by the President and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of the Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at the city and county of San Francisco.

SEC. 2. It shall be the duty of the Vice-Presidents of this Association to at once proceed to the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

SEC. 3. All persons friendly to the mining interests are eligible to become members of this Association. In the event that there is no County Organization, such person may unite with the State Association by forwarding his name to the Secretary thereof, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

SEC. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected as such County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by the Executive Committee, Jan. 22, 1892.

BY-LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittees as they may determine. They shall fill all vacancies of the officers of the Association or members of any committee. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

SEC. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of the annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

SEC. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

SEC. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

SEC. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

SEC. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of such intended meeting.

SEC. VII.—The Secretary and Treasurer shall receive such compensation for their services as the Executive Committee may, from time to time, determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22d, 1892.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F., Stock Exchange Building.

MECHANICAL PROGRESS.

SOLIDIFYING STEEL INGOTS WITH SLAG. Mr. James Munton, Superintendent of the Chicago Tire and Spring Works at Melrose, Illinois, has been granted a patent for a process of solidifying steel ingots. The process consists in pouring molten steel slag on the molten steel immediately after the latter has been poured into the mold and before it has had time to set. Mr. Munton says that he found the steel castings thus treated to be dense and homogeneous and free from pipes and blow-holes. He ascribes the improvement in the quality of the casting partly to the weight of the slag upon the steel and partly to the fact that the molten slag serves to keep the surface of the steel longer in a molten or liquid condition and thus allow greater time and freedom for the escape of gases from the steel, and the passage upward of dross or impurities contained in the metal. He uses two ladles, one for the steel and the other for the slag, so that the latter can follow the former very quickly. The process is adapted to the pouring of all classes of all steel ingots, but Mr. Munton has used it mainly in the production of annular ingots for tire blooms to be rolled into tires by his patent process. A tire ingot 10 inches high, on which 2 inches of slag has been run, falls two and one-half inches in the center, which shows how much the ingot condenses. It is noticed that the slag continues liquid after the steel has set. The slag is easily removed afterward, as it has no tendency to unite with the steel. Not more than one-half, and often but one-third, as much metal is required to be sheared off the top of ingots treated in this way, as compared with those poured without the slag covering.

A NEW ALUMINUM FLUX, called stephenite from the name of the inventor, is receiving considerable attention at Birmingham, England. It is composed of alumina and emery, the alumina being about 70 per cent. In its natural state, this flux is not volatilizable like the refined commercial aluminum, but in a blast cupola or reverberatory furnace it gives off its metallic gases or vapors, these uniting with the fusible iron, for which they have great affinity, and which acts as a condensing agent, while all impurities go to the liquid slag and are drawn off in the usual manner. It is found that metal manufactured by means of this flux will work equally well under the hammer with the most malleable wrought iron, and will harden up to the hardest steel. It also appears that the metal will work over and over again, becoming hard or soft as the operator may desire, tests having likewise proved that, in its soft state, it will stand a tensile strain of about 38 tons on the square inch, and, when hardened, of about 48 tons. Another point upon which stress is laid is that the use of such a flux causes the iron to flow in a much more liquid state, and to remain in that condition a considerable time longer than by the ordinary process, thus preventing blow-holes and faulty castings, which is, of course, a great desideratum. It is regarded as a great advantage that, by this means, iron foundries are enabled to produce their own steel castings, independent of steel works, by simply smelting scrap steel in their own crucibles.

MACHINERY-MADE TOOLS.—There are very few lines of manufactured articles that have not undergone wonderful changes, especially in the means and methods of their production, in the last half century. Hand work has been succeeded by machine work, and notwithstanding the very common argument against this change, the claim being made that the quality of the work is thus less accurate and perfect, it is a fact that not only is it more accurate and perfect, but every piece is exactly alike, the quality equally good and the quantity largely increased. A machine once carefully and accurately set, and kept in proper repair, never varies. The work is uniform and true. An example of this is well illustrated in the manufacture of that very useful article in every shop and factory, the file. It is but a few years ago that these were all, or nearly all, made by hand, enhancing their cost and not materially increasing their durability and service. To-day, nine-tenths of all the files used in this country are made by machinery. The competition in the business, largely controlled by quality, has worked to make their manufacture one in which the most perfect machines are necessary, and this spirit of rivalry has brought the machines to such a state of perfection that wonderfully fine and accurate work is accomplished by them. With the machines now in use, a file is cut with teeth varying from 14 to the inch to a number so fine as to require a magnify-

ing glass to count them, and as accurate and perfect in shape as the coarser cuts. For their production, about 5000 tons of specially prepared steel are consumed annually.

MACHINERY IN OFFICE BUILDINGS.—The construction of large buildings, especially office buildings, where large numbers of people are gathered together under one roof, is calling for a large amount of machinery to operate elevators and for general lighting and heating purposes, raising water, etc. The great Masonic Temple at Chicago, which is 21 stories in height, including basement and attic, is furnished with two 500 horse power Corliss engines, driven by eight large steel boilers—a power plant sufficient to operate quite a large manufacturing establishment. This power, says a Chicago paper, will all be needed for adapting the building to the use of its tenants for office purposes. There are to be 17 elevators, with a carrying capacity of 50,000 persons daily, and an electric light system capable of supplying 7000 lights. Water will have to be pumped to tanks on the roof to furnish such a tall building as this with the water required, as it is 302 feet from the level of the street to the roof line. It is estimated by competent and well-informed engineers that the power plants now installed in the office buildings of Chicago would aggregate almost, if not quite as much horse power as one of the largest and best equipped steel rail works. This is a remarkable incident of the progress of the age.

A NEW CEMENT FOR IRON.—The following is given as a mixture for joining pieces of iron together: Equal parts of sulphur and white lead, with about one-sixth proportion of borax, are the constituents of the mixture, and the three should be thoroughly incorporated together so as to form one homogeneous mass. When the composition is to be applied, it should be wetted with strong sulphuric acid, and a thin layer of it placed between the two pieces of iron to be connected, these being at once pressed together. The *Chemical Trades Journal* says: "It is stated that the cement will hold so firmly as to resist the blows of a steam hammer, and dry so completely in a few days as to leave no trace of the cement, the work then presenting the appearance of welding."

AMERICAN INVENTORS WIN.—A patent decision has just been made in London, which involves millions of dollars. The case is that of the Nettlefolds, of Birmingham, the wealthiest screw manufacturing company in England, against the Providence Screw Manufacturing Company. The suit was commenced by the former for infringement upon its English patent, when the Providence Company commenced placing its machinery in England, which is claimed to be superior to any other yet invented. The English Justice gave a strong decision in favor of the American company, which will now proceed to put down in England a very large and expensive plant. This machinery will be made in this country and taken across the Atlantic to be set up.

THE DURABILITY OF IRON RAILWAY BRIDGES is being carefully investigated by several of the European Governments as a consequence of the many late serious bridge disasters. The result of extended English and German investigation seems to show that under the most favorable circumstances, iron bridges are not safe for a period exceeding 75 years; and under certain conditions, their life is much shorter. The method of manufacture is of the least importance in this estimate of durability. The effect of a more or less heavy traffic upon the fiber resistance in the materials of construction plays the important part, and the pounding under train motion and the vibration due to rolling loads wear out the bridge.

NEW BAND-SAWING MACHINE.—Among the recent mechanical novelties of a practical character brought forward is a band-sawing machine, especially adapted to the use of wheel and carriage makers, chair and car shop work, where an inexpensive machine for heavy duty is wanted. The machine carries a saw from one-fourth to two inches wide, and has leather-covered saw pulleys of 42 inches diameter, the table being 39 by 33 inches, made of hardwood strips, and capable of being elevated to an angle of 27 degrees.

PADDLED HORSESHOES.—A new system of shoeing horses has recently been invented in England. By it the iron shoes are fixed to others made of sail canvas, which are then cemented to the hoof. Shoes fixed this way have been worn quite thin without moving. The process has been patented in England.—Australasian Coach Builder and Saddler.

SCIENTIFIC PROGRESS.

Measuring the Speed of Projectiles.

A Frenchman, Captain Journee, has improved, or at least has modified, the usual mode of measuring the speed of projectiles at great velocities, say from 1600 to 2500 feet per second. He also explains the peculiar phenomena of sound connected with such rapid motion of cannon balls. In his explanation, he says: The ball, which acquires a velocity superior to that of the propagation of sound, compresses the air in front of it. The compressed wave is stationary; when it passes by the ear the dry sound of the explosion is heard once only. There is besides a spherical wave, due to the discharge, which moves with the ordinary speed. The two sounds, arising from the two waves, are separated by an absolute silence. The stationary wave is utilized in order to indicate at a certain point the passage of the projectile, and thus to permit of its velocity being measured.

Let it be supposed that there are two apparatus disposed in the plane of direction capable of working and of interrupting an electric circuit under the influence of an abrupt variation of the atmospheric pressure. Imagine, further, a projectile fired at an angle of no particular degree. The compressed wave will interrupt the circuit when it strikes the apparatus, and will indicate the projectile being at a certain point in its flight. The length of time which separates the two indications, the knowledge of the firing angle, of the usual speed of sound, and of the position of the apparatus will, by the aid of a series of analytic deductions, result in the ascertainment of the velocity. This method offers the following advantages: It permits of the measurement of speeds at any angles for the initial velocity and at any distances for the remaining velocities. After each shot the apparatus are again ready for immediate action; they therefore require no attention. By this method the length of time occupied in the flight of projectiles and the duration of combustion can be measured, it appears, with a precision unknown up to the present. Mons. Cousin, artillery, has invented an interruptive apparatus which is very simple in design, and which yields results pointing to remarkable sensitiveness and accuracy.

THE GREAT SUN SPOT.—The astronomers all over the world are just at this time watching with much interest a very large sun spot, or rather cluster of spots, which are so large and so distinct that they may be quite plainly seen by the naked eye, protected with smoked glass. The spot is oval in form, with a greater diameter of about 100,000 miles and 500 for its smaller. It occupies, in its longer measurement, about one-seventh of the sun's diameter—or a superficial area about nine times as large as that of the earth's hemisphere. Prof. Wendell, of Cambridge if we are not mistaken, says: "It is the most magnificent display of the kind which has been seen during the last 20 years. It will be immediately followed by a magnetic disturbance on the earth, and we may expect a violent storm somewhere on our surface before long. The period of solar disturbance, ten years apart, will return next year. The effects on earth will begin to be manifest this summer, and the atmospheric disturbances will increase in intensity for the next two months. During this period there will be an abnormal increase in the number and intensity of the cyclones." If this spot should be the cause of any serious electrical or meteorological disturbance in the earth's atmosphere, we see no reason why such manifestations should not be expected in a much shorter period than that named by Prof. Wendell. It is scarcely conceivable that sun spots should produce any disturbance in the earth's atmosphere beyond, possibly, something of a merely mild electrical character.

THE PHONOGRAPH ENABLES THE DUMB TO TALK.—There seems to be much probability that the phonograph may soon have quite a new and important application. Mr. Edison, we believe, claims that its application is as yet in its infancy, and some recent experiments at Indianapolis seem to warrant the correctness of that assertion. An apparently well authenticated report has been made that the authorities of the Deaf and Dumb Institute of that city have been making some interesting experiments, and believe that in connection with it they can teach the majority of the deaf mutes under their charge to talk. They find that the instrument concentrates the sound at the drum of the ear in such a way that many of their pupils, otherwise deaf, are enabled to hear. The phonograph was tried with 27 boys and 22 girls. Of these only three girls were un-

able to hear anything at all. Twenty boys and 20 girls could hear instrumental music, while 11 boys and 15 girls could distinguish spoken words. Of the 56 whose hearing was tested by placing the phonograph tubes in their ears, 28 could hear best with the left ear and 14 with the right, while 11 heard alike with both.

Animal Electricity.

Prof. J. G. McKendrick recently delivered a lecture before the British Royal Institution on the subject of "Life in Motion or the Animal Machine." The professor commenced by reminding his audience that he had in a previous lecture spoken of the analogy which existed between the muscle as a little engine, and other engines, and how the animal body yields a larger percentage of power in proportion to material consumed than does any engine. The lecturer then said that the subject of which he was about to treat was the electricity given off by animals.

It had for a great many years been known that certain animals were possessed of electricity, though the subject had only of comparatively recent years received the close attention of scientific investigators; and we yet had more recently learned that every bit of life has its share of electricity. The lecturer proceeded to show, with the aid of a most delicate galvanometer, the electric current which came from a piece of frog muscle, and afterward from the frog's eye and heart. Professor McKendrick showed, by a simple experiment, the strength of current from his own hand, and the way in which the current became intensified on his contracting the muscles of his arm, so as to deflect the needle to the right on his contracting the muscles of his right arm, and to the left on his doing so to the left arm.

Electricity in animal life was most marked in certain fishes, some 50 species of which were possessed of it in a considerable degree, though only some half-dozen of these were at all well known—the Torpedo Ray, the Gymnotus, and a fish found in the Nile, and called by the Arabs the thunder fish, being the most familiar examples of these. That the electrical organs were under the control of the fish, had been proved by an interesting experiment; a strong current of electricity being sent through a vessel containing some specimens of Gymnotus, the fish at once tried a shock on the unknown foe, but finding that unavailing, placed themselves in a position in which the current would pass through them sideways—precisely as an electrician would do if he should be similarly situated.

In conclusion, the professor told his young hearers that, although so much was already known, there was yet plenty for future workers to do, as the subject of which he had been talking was far from a settlement. He advised them to keep their minds open for the reception of the truth, from whatever quarter it might come.

INDIVIDUALITY IN HUMAN HAIR.—One of the wonders revealed by the microscope is that human hair possesses a marked individuality. Not long ago, a single hair—the evidence in a murder case—was shown Dr. Jeserich, with the request that he determine whether it was from the head of the supposed murderer, whose hair was of the same color. After examination, the specialist decided that it was sufficiently unlike those of the suspected man to acquit him. The real murderer was subsequently captured, and his hairs were found to be identical in character with the one first examined.

COLORED PHOTOGRAPHS OF STAINED GLASS.—A Swiss doctor has succeeded, after a long series of experiments, in obtaining photographs of stained glass windows in their original colors. His photographs contain red, violet, yellow, green and white. They were sent to Dusseldorf, after passing from hand to hand on the way, and the photographic journals speak favorably of their retention of the colors. These samples were taken in 20 seconds by the mid-day sun.

"THE SKY is for all of us. Bright as it is, it is not too bright nor good for human natures daily food. Sometimes gentle, sometimes capricious, sometimes awful, it is never quite the same for two moments together; almost human in its passions, almost spiritual in its tenderness, almost divine in its infinity, its appeal to what is immortal in us is as distinct as its ministry of chastisement or of blessing to what is mortal."

BELTS running over pulleys of small diameter at high speed ought to be as thin and as wide as possible. Orange tan leather of uniform thickness answers remarkably well.

ELECTRICITY.

Electrical versus Gas Light.

Considerable attention is just now being paid in Germany to the comparative value of electrical and gas light, and what relations the one should bear to the other. The question is being agitated both in Government circles and by capitalists. The Government has in contemplation an act "to regulate electrical enterprises." The act appears to refer only to lighting plants, and not to other electrical enterprises. "An electrical convention was recently held of persons engaged in electric-lighting, at which 150 cities and large towns were represented. The object of the meeting was to ascertain, as far as practical, what progress has been made in the science of electrical-lighting and what there might be of value in it to their respective communities—whether by the establishment of electrical light plants the general welfare of the communities was advanced, or whether the benefits accrued to a limited portion of the people only.

The question was considered whether, by the use of electricity in lighting, the sales of gas were curtailed, and if so, whether such curtailment had in any way advanced the price of gas, and thereby, the general cost of lighting to the people at large. The general question, whether the development of electricity for lighting purposes has really been any great step forward in human progress was also considered.

The conclusion arrived at seemed to be that only certain consumers, such as theaters, hotels and large stores and dwellings, were especially benefited. It was held that the introduction of gas had marked a new epoch in civilization generally, as had steam for power. Electricity had done the same in the more convenient use of power, and in telegraphic communication. But it was denied that electricity for light had as yet proven of any large benefit to the general public, even in the midst of large communities. Electricity had failed in producing a light comparative to gas in useful brilliancy, steadiness, reliability and cheapness. Its greatest value was in paralleling gas for special purposes and in furnishing light without heat and as a non-consumer of oxygen.

Gas was everywhere holding its own, and bade fair to continue to be of the most service to the community at large, until the science of electric-lighting had reached far in advance of its present standpoint. Thus far, electricity had caused a large general increase in quantity and expense of lighting without furnishing any adequate return. The convention commended the Postmaster-General of Germany for the advice which he had given to his countrymen and gas producers to go slow and consider well whether it will pay them to further parallel existing gas works by either arc or incandescent electric lights.

It is evident that both the discussion and advice were decidedly from the gas manufacturers' standpoint. While some truth worthy of consideration was evolved, it is doubtful whether much of practical value was brought out which people of this progressive age will heed. We imagine that the grave advice of that really able and experienced body of gas producers will have much influence in deterring capitalists from continuing to extend their investments in electric light works.

Electric Roads in Southern California.

The Los Angeles *Herald* says, editorially, that the manager and receiver of the cable system of Los Angeles is so thoroughly convinced of the superiority of electricity over cables as a propulsive force that he will substitute electric cars for those now being operated by horse power, and not use the cable system as employed on the more recently constructed portion of the company's lines. The *Herald* further adds that the electric roads have come to stay.

The San Diego *Union* says that the electric roads which Mr. Spreckels is now constructing in that city will be supplied with the very latest and most approved appliances for speed, comfort and convenience, and the investment by this wealthy and sagacious family of business men of so large a sum of money in San Diego at this time is most substantial and convincing proof that capitalists who are well informed as to conditions here, have assured faith in the city's early and rapid growth.

The *Union* expresses its own opinion in regard to electric roads as follows: A year ago electric street-railways were operating in 127 Eastern cities, and it is probable that this number has been doubled since that time. There are, of course, economic and other reasons for the rapidity with which

these roads have been multiplied, and for the fact that they are supplanting horse car roads everywhere. In the first place, they can be operated for from 20 to 22 per cent less than the horse car railroad. In the second place, the heavy cars they are compelled to use require a substantial and well-built roadbed, which insures smoother running; and in the third place, they can be run up to a maximum rate of speed allowed by law, and thus economize the time of people in going to and from their homes and places of business. It will be admitted that these reasons are conclusive, and establish the electric road as the one that will inevitably take the place of horse car lines in all cities of any importance.

Long Distance Telephoning.

The advantages of long distance telephoning are becoming more and more apparent. In response to a question on the subject recently addressed to Superintendent Mallet, of the Bell Telephone Co., that gentleman said:

"Business men are availing themselves of its advantages to carry on communication that could not be done by telegraph. They can discuss questions and negotiate as though they were face to face. The metallic circuit in use on the long distance line conveys the message perfectly. Where one has a city telephone with a metallic circuit, he can get a message from New York or Boston in his own office; but with the ordinary ground circuit, one living here could send a message to New York that would be understood, but he would not be likely to receive a distinct one in return. A new line has been opened to Pittsburgh, and is now being extended to Chicago. There is a comparatively greater demand for long distance service in New York, Philadelphia and Boston than elsewhere. The greater population at those points does not account for it altogether; the value of the system appears to have received quicker recognition there. In the city of Rochester there is one firm that pays \$75 to \$80 a month for its telephoning, and another paid over \$125 last month."

THE TELEPHONE IN EUROPE.

Some interesting and rather surprising statistics on the use of the telephone in European countries have been collected. In London, the greatest commercial city of the world, only 1.5 persons in 1000 use the telephone. The telephone is used most in countries where the service is owned or controlled by the State. In Germany, Switzerland, Norway and Sweden, from 100 to 400 persons in every 100,000 of the population are subscribers. In Great Britain only 58 persons in 100,000 use the telephone. In Berlin 11, and in Paris 4.2 out of every 1000 inhabitants use the telephone.

It is reported that the British postoffice authorities contemplate opening a telephone line between London and Dublin. The working of the Paris-London telephone has so far been attended with marked success, and it is doubtless due to this circumstance that the new line is projected.

The Electric Road About New York.

A striking example of the efficiency of electric roads is seen in the great satisfaction which is being given to both stockholders and passengers by the long suburban road from Newark to Orange, a popular locality in which New Yorkers seek to spend their nights and leisure from the turmoil of the city. The road is operated by the trolley system. A New York paper speaks of this road as follows: Talking about the mule and horse going, the trolley can beat them at their own game, for it certainly goes at least 50 per cent faster, retiring the animals at the same time. On the new electric line just opened between Newark and Orange, the time between the terminals of the line has been reduced from an hour and seven minutes to 42 minutes; and yet some people persist in wondering why the trolley system is a favorite and why the receipts of a road increase as soon as the horse is discarded and the electric motor put in its place. Just consider the number of friends the new electric line will make and the number of extra 25-minute naps that will be taken in the morning. The wonder is, not that electricity is so frequently introduced, but that horse cars should be tolerated at all when the railway companies can be persuaded into using electricity.

We alluded last week to the fact that the opposition of the Mayor of Brooklyn, N. Y., to the trolley system had finally been withdrawn. The *Eagle* of that city, in alluding to this matter, says:

The opposition to the change has been wild and absurd as usual, with the familiar stories of plague, nuisance and sudden

death, and without a single fact in support of the allegations. The paper also congratulates the citizens on the coming addition to the means of rapid transit, and points out that in like manner, though more vigorously, other boons were fought against in the City of Churches, such as the introduction of the water supply, the horse railroads, paid firemen, elevated roads, and uniformed police. All these things, though bitterly opposed, have come, and now everybody rejoices at their existence. So it will be with the trolley system. We are heartily glad to see that the street railway companies have made so successful a fight for themselves and for the public they serve.

AN APPROPRIATE OPENING.—When the President of the United States touches the electric key which is to start the machinery of the World's Columbian Exposition, it is expected that the signal will neither be confined to the Exposition nor even to the vast continent, in commemoration of whose discovery that great Exposition will be given, but the signal will most appropriately have a world-wide reach. Every city of any considerable size both in Europe and America will at that moment be placed in electrical connection with the little key upon which the President will press his finger. Both Europe and America will feel the impulse which will start the machinery at the World's Fair, and which will be followed by the ringing of bells, the screeching of steam whistles and the display of the national flag in all the chief cities and towns in the United States. Such will be a most appropriate opening of the celebration of an event in which all the world has an interest, and which has made and left an impress upon the world's progress such as no other event has done since the dawn of creation.

ACCUMULATION OF ELECTRICITY BY GRAVITY.—It is reported that the Northern Railway Co., of France, will make experiments with an electric locomotive on their line from Paris to St. Denis. On this line, the trip in one direction being all down grade, does not require the use of a locomotive. The experiments are being made with a view of being able to keep the motors in motion on the down grade and restore to the batteries a portion of the power generated by the gravity of the train, thus saving a great amount of energy which, under ordinary circumstances, would be entirely lost.

AN ELECTRIC LIGHTING PLANT, according to the *Oroville Mercury*, has been placed in the Stow quartz mine at Forbestown. The dynamo will be run by the same water power that propels the machinery to the mill. Wires will run underground to all portions, and incandescent lights will take the place of the candles heretofore used by the miners in the drifts and tunnels. The works above ground will be illuminated with large arc lights. This improvement marks an important epoch in quartz mining in Butte, as it is the first of the kind to be made.

VIOLETS FORCED BY ELECTRICITY.—A Parisian electrician, it is reported, has succeeded in forcing violets by the aid of his battery, and recently sent a bunch of these fledglings, only four hours old, to the ex-Empress Eugenie.

GOOD HEALTH.

The Human Ear.

The human ear is a much more delicate organ than most people suppose. It is extremely dangerous to interfere with it by use of earpicks, or any of the various instruments used for the purpose of cleaning it from wax. The wax is a natural secretion, and unless the ear becomes diseased it does not accumulate any faster than is necessary to protect the passage from the entrance of insects and various particles which might otherwise be forced in and tend to interfere permanently with the hearing. The greatest care is necessary in washing the ears of little children. They should be washed outside, but on the inside only so far as the finger wrapped in a soft towel will go. The practice of forcing a hair pin or any other hard instrument into the ear passage is fraught with danger of injuring the membrane and causing permanent deafness.

Earache is a malady of childhood and causes most distressing pain. The simplest remedy for it is to take a little cotton dipped in warm sweet oil and put it in the ear passage. A danger that may arise from doing so simple a thing as this is that minute particles of the cotton may be left in the ear.

To prevent this, some physicians advise making a little wad of the cotton and wrapping it in the finest and thinnest linen cambric that can be found, and dipping this in

warm sweet oil. In case of intense pain, a few drops of hot laudanum or camphor may be used with the oil. When foreign bodies get into the ear they should be removed by syringing them out with warm water. To attempt to remove anything from the ear passage by forcing an instrument in is a rash thing for anyone except an aurist to undertake. The best medical practitioners refuse to treat affections of the ear or eye, but send their patients to specialists.

WONDERFUL TRAINING OF THE EARS. It is really wonderful in regard to the acuteness to which the human ear may be trained.

At the meeting of the locomotive engineers, to be held in Cape May during August, an interesting paper will be read by H. H. Dantzer, formerly an engineer on the Reading railroad, but now a contractor in West Philadelphia. The paper will deal entirely with the wonderful manner in which engineers on railroads, steamboats and the masters of mammoth machinery ascertain accurately and instantly when anything goes wrong with the machinery under their control.

Strange as it may seem, the only reliable friend of the engineer is a well-trained ear. The greater part of Mr. Dantzer's paper is filled with incidents relating to railroad work, but the really wonderful incidents of which he treats are taken from the mammoth press-rooms in which Philadelphia abounds.

Mr. Dantzer's paper tells of many queer incidents of his experience as a railroad engineer. The master of a locomotive gets to know his engine as a mother does her child. In the darkest night, with the train dashing along at the rate of 45 miles an hour, the trained engineer hears a slight sound which is out of the ordinary. He not only becomes aware of it by reason of hearing it, but if he were deaf as a post the disorder would be communicated to him through the medium of the throttle. He would feel a slight jar which would indicate as clearly as the sound that something was out of order, and, if the occasion warranted, a stop would be made at once or the matter would be attended to at the next station.—Philadelphia Record.

MYTHICAL SNAKES.—The cause of persons whose nerves are excited by protracted and excessive use of stimulants seeing the shapes of animals passing before them is not due wholly to imagination. In fact, the fancy only operates to induce a belief that what is seen is alive and hideous.

The eyeball is covered by a network of veins, ordinarily so small that they do not intrude themselves visibly in the path of the light that enters the sight, but in the course of some diseases these veins are frequently congested and swollen to such a size as to become visible, and when this happens the effect generally is to appear as if there were an object of considerable size at a distance from the eye.

Of course, this vein is generally long, thin and sinuous like a serpent, and the figure seen is frequently startlingly like a snake. That they seem to live is due to the fact that they are often not in perfect line with the direct front of sight. They are either to the side, up or down from the focus, therefore, when discovered, the victim naturally turns his eyes toward the effect, and the effect, of course, moves away.

The eye follows, and thus a continuous and realistic motion is got. Now, if the eye be turned to the front again quickly, it will see another snake, which, if watched will glide away in the same manner. The writer of this is afflicted by malarial disease, and after his eyes are thus congested many strange shapes and clouds pass within his vision, which, if he were in a state of nervous collapse, might easily be all that are seen by those suffering from delirium tremens.

MUCILAGE AS MEDICINE.—A correspondent sends us the following item: Mucilage is an excellent remedy for burns; apply it to the burn and lay on any soft blank paper. The mucilage soothes and the paper excludes the air. For corns there is nothing better than mucilage applied every night. It softens the corns so that they may be easily trimmed. A feverish patient will gratefully drink water in which gum arabic has been dissolved. The cooling draught may be flavored with lemon or orange.

LIMEWATER is an element not so much used as it would be if people realized its effect on the bones and teeth of growing children. When placed in milk, it adds a sweeter flavor even if no more than a teaspoonful is used to a tumbler of milk. It may also be used for indigestion. When the skin is broken out from poison oak, an excellent remedy is a solution of saltpetre. If strong, it causes pain when applied, but it subdues the poison.



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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Mining Horsepower Hoist—F. W. Krogh & Co.
Delinquent Sale—San Francisco M. & M. Co.
Delinquent Sale—Gray Eagle M. Co.

See Advertising Columns.

Passing Events.

The miners' and farmers' committees are at work in Washington trying to get the River and Harbor Committee to pay due heed to the demands of the California Miners' Convention and River Improvement Convention. The Senators and Congressmen from this coast are helping them. The party in power which is trying to make a record for economy may not grant the appropriations asked for, but may grant a part at any rate. Still, we ought not to be disappointed if only a start is made this session. It is difficult, in a few weeks, to entirely rehabilitate an industry which has been closed for years. Everything thus far is favorable to the miner. Various bodies of prominence and financial weight have indorsed the miners' demands and added their influence. No such united action has ever before been taken by Californians in connection with this subject. The metropolitan and interior press have lent their aid in every way. Congress is being urged on all sides to act promptly. Something must come of all this. If it does not come at once, it will not be our fault; but it is pretty certain that in the end the influences brought to bear on Congress will bring success. It is the question of the day with the mining community of this State. The quartz miners are not being overlooked,

since the committees are alive to their interests also, and will bring forward certain mining law amendments favorable to the quartz and drift-mining industries.

Iron Ship-Building.

The Fearless, just completed by the Union Iron Works of this city for J. D. Spreckels & Bro., is the largest steel tug boat ever built in the United States. The new vessel is fully equipped with all modern appliances, including fire pumps, and during the trial trip on Saturday last acquitted herself in a very satisfactory manner.

Most people have come to a realizing sense of the great work accomplished by the Union Iron Works in bringing their ship-building plant to a point where they can build vessels of all classes for the U. S. Navy, but not every one understands how much ship work is being done in the mercantile marine branch. The repair work alone, at an important port like this, is very heavy. They have provided a first-class dry dock, heavy shears and everything necessary to take out large vessels, and to handle the heaviest boilers, etc. Until the Union Iron Works built their new plant, such facilities as these, at one point, were wanting at San Francisco.

Beginning with the coasting steamer Arago, the first metal vessel built on this coast, these works have continued to enlarge their plant and facilities steadily. Of course, their principal work has been on the Government cruisers. The San Francisco and Charleston are both in active service. The new cruiser No. 6 is plated as far up as the armor deck and will be soon ready for launching. The cruiser Monterey, is well advanced and ready for the armor plates. Work is also well advanced on the battleship Oregon.

A new steamer for the lighthouse service is almost ready to be launched, and work on the large steamer for the Pacific Mail Steamship Co. is going on rapidly. New boilers for the mail steamer Rio Janeiro will soon be put aboard.

The Union Iron Works people deserve great credit for having pushed this branch of work so to the front, that it has become the first in importance. Many predicted failure for the whole enterprise, as it was thought we could not compete with the East. Experience, however, shows that energy, intelligence and capital has won, and the Union Iron Works has earned a name for itself to be proud of. They now employ 1750 men. They are still enlarging their business, having, as stated last week, purchased the Pacific Iron Works, down town, where the mining machinery department will be carried on.

Comparative Cost of Working Ores.

The Granite Mountain Mining Co. of Montana yielded last year 85,471 tons of ore, at an average cost of mining of \$5.73 per ton. The three mills of the company crushed 72,622 tons (wet) of ore, or 68,850 tons (dry), and 10,807 tons (wet) of salt, or 10,645 tons (dry). The salt and ore were mixed before crushing. The cost of milling was \$10 per ton (dry).

The Dalmatia mine, El Dorado county, California, belonging to the American River Syndicate, an English corporation, handled at its mill 43,000 tons of rock in the 13 months from July, 1890, to August, 1891. Between the 1st of August and the 31st of December, the machinery dealt with 19,000 tons of ore. The gold was extracted at the average cost for mining and milling of 50 cents, or 2s 1d per ton. In October there were crushed 4448 tons, which were mined and milled at a total cost of 43 cents per ton. The mill is run by electricity, generated by water power, as described in the MINING AND SCIENTIFIC PRESS of Jan. 23, 1892. Most of the ore comes from an open surface cut.

But the cost of \$15.73 per ton for silver-

gold ore in Montana, against the cost of 43 cents for the gold ore in California, is sufficiently remarkable to be noted. Large quantities of ore are dealt with in each instance. It is no mere experimental matter, but every day work the year round.

It may perhaps be argued that such a comparison is unfair, as the methods of mining and milling are different in the instances noted. It is true that they are, but there is no such great difference as is shown in the comparative figures given. It is an argument in favor of gold-mining as carried on in California, that such cheap work can be done, since ore of very low grade may be worked at a profit and in large quantities. When such a great quantity of ore can be mined and milled at less than half a dollar a ton, the possibilities of the gold-mining of the present and future may be realized.

The Miners' Association.

The committee which went from this State to Washington on the debris matter are actively at work. They had one meeting in Senator Felton's room and one in Senator Stanford's room. Senator Felton, by the way, has sent all the copies obtainable of the engineers' report to California, and is actively aiding the business. Congressmen Camminetti and Geary are also assisting as much as possible.

Several of the counties are collecting money for the movement. Nevada county Supervisors have given \$1000, and the Miners' Association of the same county another \$1000.

The San Francisco Chamber of Commerce supports the movement heartily and has adopted suitable resolutions. The San Francisco Board of Trade has also taken an active part in both moral and financial support.

At a meeting of the Executive Committee of the Miners' Association held this week in this city, a committee was appointed consisting of Charles G. Yale (of the MINING AND SCIENTIFIC PRESS), A. Walrath and Thos. R. Church, to arrange for organizing a branch association in San Francisco county. The Finance Committee reported favorably in the matter of collections in this city.

El Dorado County Slates.

In December last, Melville Attwood, Esq., of this city, read before the California Academy of Sciences a brief paper on the California slates, exhibiting at the time several specimens from the Chili Bar slate quarry, El Dorado county. Mr. Attwood had made a microscopic investigation, and pronounced the slate having the characteristics described, and described the specimens which he exhibited as good as any in the world.

The only newspaper which published this paper of Mr. Attwood's, was the MINING AND SCIENTIFIC PRESS. The academy does not publish its proceedings for months after they occur, and as we recognized the fact that this opinion of the California slates, coming from an experienced geologist, microscopist and mining engineer, was very important, the paper was at once published in our columns.

Mr. Attwood's article attracted wide attention, and the quarries have been receiving a deluge of orders far beyond their present capacity to fill. The following letter on the subject is self-explanatory:

PLACERVILLE, Feb. 2, 1892.

Melville Attwood, Esq., San Francisco, Cal.—MY DEAR SIR: Since the publication of your paper of December, there are more orders for slate than ever, some mentioning the fact you stated about the quality. The Chili Bar Company cannot fill near all the orders, and some large orders are asked to be filled at \$8 per square, delivered at the R. R. depot at Placerville, but they cannot be filled at any price, as the slate cannot be got out. If some other company were operating, Chili Bar Co. would turn over \$12,000.00 worth of orders at this moment.

You will see what good your paper has done, as it is a fact that orders for 10,000 squares have been received that mention you or your paper. From the increase of orders and the impossibility to fill them, it looks like capital would invest in the slate grounds. Yours most truly,
GEORGE W. KIMBLE.

The California Building at Chicago.

At the meeting of the California World's Fair Commission, last week, a final choice was made from the 29 plans offered by the various architects, for the State building to be erected at Chicago. The design selected by the Commission as the best, was that submitted by A. Page Brown of this city.

It will be seen from the engraving, which we have prepared from Mr. Brown's drawings, that the style of the proposed building is that of the well-known "California Mission," with the arcade, Spanish roof garden and flat dome. When the old padres, headed by Junipero Serra, came wandering into this region from Spain and Mexico, their idea was to convert the Indians and incidentally take possession of their horses and lands. The Indians were gathered around the missions and had to settle down to work—this being called the first settlement of the State. Wherever the Mission fathers determined to stop, they put up these mission buildings, consisting of a church, with the necessary structures for residence, storage, etc. All the buildings were of the same general style, with broad, arched corridors and tiled roofs, the usual material being sun-burned adobe bricks, commonly whitewashed.

Mr. Brown has closely copied the best features of these old Mission buildings, maintaining the simplicity of detail which is a marked characteristic. These peculiar structures, many of which are still standing, are much admired by Eastern tourists, and in fact it remained for travelers to discover their picturesqueness and beauty, the old Californian seldom looking beyond utility in such matters. The buildings are very cool in the hot summer and comparatively warm in winter, the thick walls, wide and low, being also peculiarly adapted for a country where earthquakes are liable to occur.

The old Mission buildings have been so often described and figured in various publications that they are everywhere recognized as peculiar to California. It is therefore very appropriate that the California building at the World's Fair should be of this type. The only wonder is, however, that such good judgment should have prevailed, and something chosen so common here, but which will be an object of curiosity to visitors to the World's Fair. As a general proposition, we might have expected some ornate structure having nothing whatever to do with this State or its architectural history. As it is, the Commission may be congratulated on its excellent choice, and Mr. Brown also for confining himself to the peculiarities of the type, and carrying out his plans in such a skillful manner.

The extreme measurements of the building will be a length of 500 feet by a width of 110 feet. The total floor area will be 100,000 square feet, of which 60,000 feet will be on the ground floor. From the ground to the eaves will be 50 feet, and to the center line of the roof, 65 feet. The top of the dome will be about 80 feet high. The lower portion of the roof is to be covered with genuine Mexican tiles, and the upper portion, including the dome, with iron plates shaped like the tiles. It is intended that the walls shall be a close imitation of the adobe. Plenty of the well-known adobe soil of the State could be spared, of course, to build with after the Mexican fashion, but in the climate where the building is to be erected, the adobe could not very well be sun-dried in the way it is done here.

The main entrance of the building will be in the center, as the drawing shows, the various departments being arranged along the sides of the structure. The gallery will afford an area of about two-thirds that of the ground floor. The offices are to be grouped in the second story in such a way as to command from them a view of the whole interior. It is estimated that the cost of this building will be about \$75,000.

These plans will doubtless be accepted at once by the construction department of the World's Fair, and work on the building will be commenced as soon as possible.

A great deal more has been already done in preparing for the World's Fair than

ing, George B. Post, says of it: "Two of the vast machinery halls of the Paris Exposition could be wheeled through it, and the Auditorium, the building of which Chicago is most proud, could be pushed under its great roof, tower and all."

these buildings, many of which are in process of construction. There is good reason to believe that the California building will have its due share of attention; and when filled with the varied products of this great State, will attract numberless visitors whose

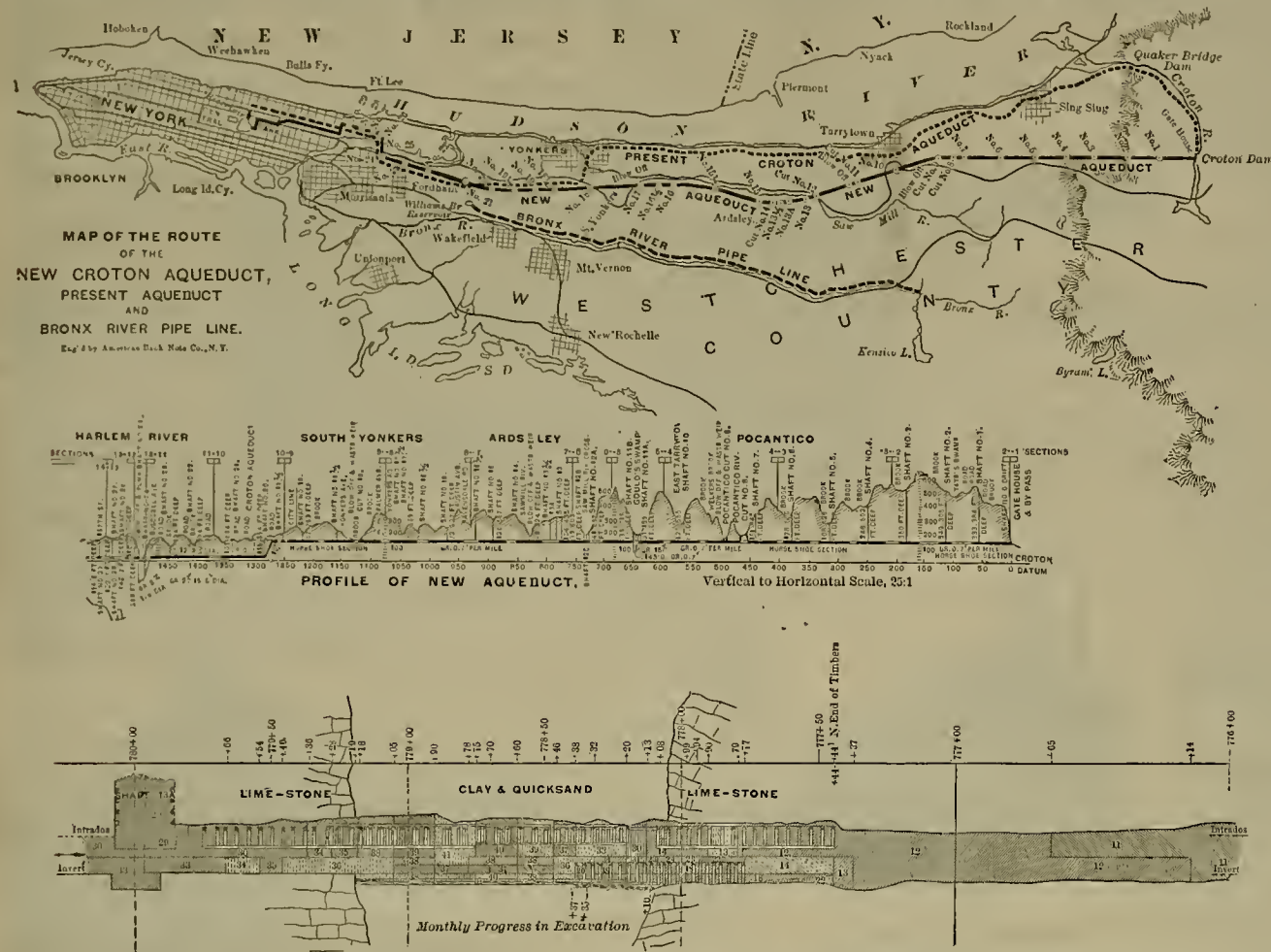
An Over-Ambitious Idea.

Such seems to us that involved in the proposition of the New Yorker that the silver in the United States Treasury, amounting to some 15,000 tons, be cast into plates, and with these a palace be built on the World's Fair grounds; said structure to cover an area of 600,000 square feet. Above this palace a tower is to be lifted to a height of 300 feet, the same to be surmounted by an image of the American eagle, with wings having a spread of 100 feet—all of solid silver.

Now, if by some ingenious contrivance the bird could be made to flop its wings and screech, as during the late Chilean unpleasantness, the spectacle would be complete and the effect produced calculated to duly impress the foreigners likely to collect at Chicago on this august occasion.

When it is considered that the cost of this gorgeous edifice will not exceed \$1,000,000, it is hardly to be expected that any American will object to such use of the white metal. Nothing like mixing with the useful and aesthetic a spice of the fantastic.

It being, however, often the case that such over-ambitious endeavor to inspire admiration excites only ridicule, it might after all be as well perhaps that this silver remain where it is, or, better, be coined into dollars having each the likeness of the great American eagle impressed upon it.



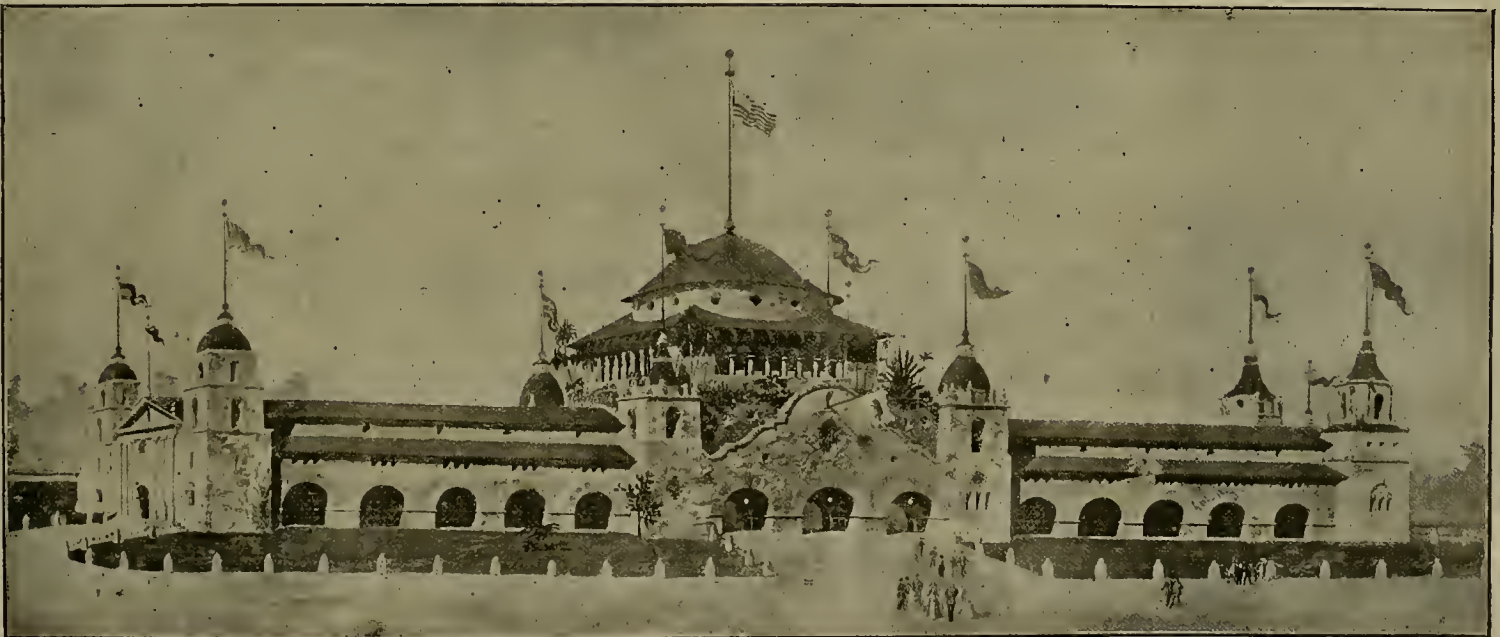
many persons imagine. Many of the buildings are in process of construction. The buildings themselves are in many varied styles of architecture. The Administration

The Agricultural building will cover nine acres and cost \$540,000. Its dimensions are to be 800 by 500 feet. All these buildings are well under way.

influence will in the end be of the greatest benefit to us.

JUDGE SAWYER'S ESTATE.—The ap-

THE CROTON AQUEDUCT.—In recent numbers of the PRESS, descriptions and engravings have been given of the methods of timbering adopted in the long tunnel of



CALIFORNIA'S BUILDING AT THE WORLD'S FAIR.

building alone will cost over half a million of dollars. It will be about 250 feet square and will consist of a central building, surmounted by a gilded dome of fine proportions and with large square pavilions at its corners. The edifice devoted to manufactures and liberal arts will be the largest of the kind ever constructed; it is to be 1688 feet long and 788 feet wide, covering in all about 31 acres. This will cost about one million dollars. The architect of this build-

The Art, Machinery, Electrical, Horticultural and U. S. Government buildings are all to be grouped about the basins and lagoons; that for Manufactures and Liberal Arts occupying the central position close to the lake shore. Outside of the circle a large space is reserved for the erection by foreign governments of buildings to illustrate the special features of those countries.

We have in previous numbers of the PRESS illustrated and described some of

praisers of the estate of Lorenzo Sawyer, deceased, made their report to the Probate Court this week. The total value of the estate is shown to be \$129,290.46. The estate consists of real property in San Francisco, Santa Barbara and Alameda counties, 300 shares of Pacific Gas and Improvement Co. capital stock, money on hand, law library and 100 shares of capital stock of the Commercial Bank of Tacoma, furniture, family portraits, etc.

the Croton aqueduct. On this page are given a map and a profile of the new aqueduct and a section showing monthly progress in excavation. The dimensions have been given in previous articles. The engravings will give a good idea of the extent of this great work.

THE directors of the W. Y. O. D. Mining Co., Nevada Co., have declared dividend No. 6 of 10 cents per share.

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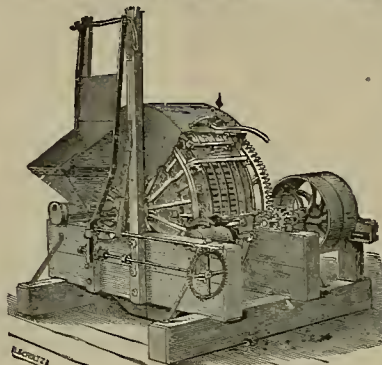
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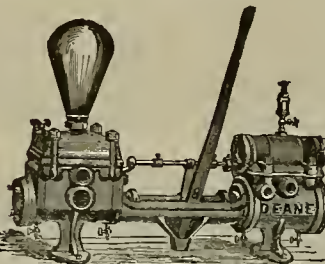
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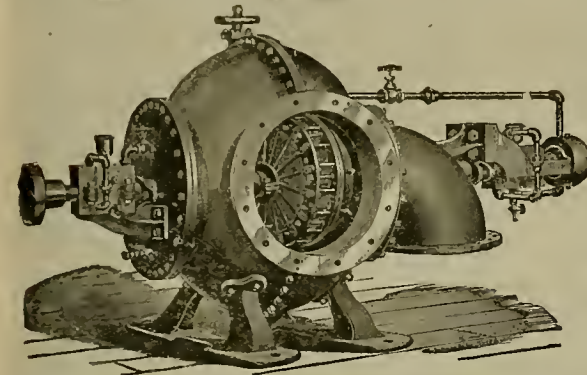
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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing.
Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.
Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

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Broad and Narrow Gauge Locomotives, Mine Locomotives by Steam or Compressed Air, Plantation Locomotives, Noiseless Motors for Street Railways, Furnace Locomotives, etc.

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COIN RETURNS ON ALL BULLION DEPOSITS IN 24 HOURS.
WORKING TESTS OF ORES BY ALL PROCESSES.
SPECIAL ATTENTION PAID TO CONCENTRATION OF ORES.
Ores Received on Consignment, Sampled, Assayed, and Disposed of in the Open Market to the Highest Bidder.

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GOLD AND SILVER REFINERY
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Highest Prices Paid for Gold, Silver and Lead Ores and Sulphurets.

— MANUFACTURERS OF —

BLUESTONE, LEAD PIPE, SHEET LEAD, SHOT, Etc., Etc.

ALSO MANUFACTURERS OF

Standard Shot-Gun Cartridges,
Under Chamberlain Patent.

JOHN TAYLOR & CO.,

IMPORTERS AND DEALERS IN

ASSAYERS' MATERIALS, MINE AND MILL SUPPLIES,

ALSO CHEMICALS, AND PHYSICAL, SCHOOL AND CHEMICAL APPARATUS.

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We would call the attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our full stock of Balances, Furnaces, Muffles, Crucibles, Soot-burners, etc., including, also, a full stock of Chemicals.

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast, we feel confident from our experience we can well suit the demand for these goods, both as to quality and price.

Agents for the Morgan Crocker Co., Battersea, England. Also for E. G. Dennison's Silver Plated Amalgam Plates. The plates of this well-known manufacturer are thoroughly reliable, and full weight of Silver guaranteed. Orders taken at his lowest prices. Our Illustrated Catalogue and Assay Tables sent free on application.

JOHN TAYLOR & CO.

Nevada Metallurgical Works.

NO. 23 STEVENSON STREET,

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Ores worked by any Process.

Ores Sampled.

Assaying in all its Branches.

Analyses of Ores, Minerals, Waters, etc.

Working Tests (practical) Made.

Plans and Specifications, furnished for the most suitable Process for Working Ores.

Special attention paid to Examinations

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The Best Mining District
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THE BEST NEWSPAPER published in the district is

THE TIDINGS.

Daily and Weekly edition. Gives all the Mining News. Dealers in Mining Machinery and Mining Supplies will find THE TIDINGS the best medium for directly reaching the owners or managers of mines. Investors in mines will find it to their advantage to subscribe.

Many mines are in successful operation, and new enterprises are being instituted and many others are in contemplation.

DAILY, \$8 00 a year; WEEKLY, \$2.50, in advance.

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T. C. HOCKING, Editor.

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226 Market St., N. E. cor. Front (up stairs), San Francisco
Experimental machinery and all kinds of models, tin and brasswork. All communications strictly confidential.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, February 18, 1892.

Although crop prospects continue favorable, yet the trade is not disposed to look on the bright side, and until we have passed well into the spring months conservatism will prevail. This spirit of conservatism has been grounded in business men by bitter experience that in this "glorious climate of California" nothing is more certain than the uncertain. This feeling is possibly giving way to the conviction that under tree and vine culture the climate is becoming more fixed in its character so far as concerns decimating north winds, drouth and similar evils. Iron manufacturers continue to report orders being received, and that, so far, everything points to an unusually prosperous season. Railroad building promises to assume large proportions. This opinion is based on the fact that two large railroad companies at the East have determined to construct to this city so as to have a Pacific ocean outlet. Their building into this State will cause more feeders to be constructed, and from this source alone more active times can be looked for.

The local money market is easy, although it is said that there is no great pressure to place funds. This condition will hardly change until after assessment day in next month. Considerable money, it is said, has been sent out of the State to avoid paying taxes. After assessment day these funds will more than likely be returned for investment.

MEXICAN DOLLARS—Shipments the past week aggregate \$204,927 to China and \$40,000 to Japan. The market is stronger at about 7 1/2 cts.

QUICKSILVER—Receipts the past week aggregate 253 flasks. The market is weak at quotations.

SILVER—The market has ruled strong at steadily advancing prices. The action of the market does not indicate that the upward movement is based on speculation, but rather on a legitimate demand in this country and in Europe. If the latter is the foundation on which rests the improvement, then it is quite probable that we will witness still higher prices. The Bland Silver bill is fairly before the House of Representatives, but no active debating is looked for yet awhile, perhaps not until the tariff bills are disposed of. It is quite generally conceded that the bill will be passed.

ANTIMONY—The market is lower, with a weak tone prevailing at the close.

BORAX—The market is essentially unchanged. Considerable is going forward to the East both by rail and water.

LIME—Receipts the past week aggregate 3606 hhls. There is a continued free demand for the Hawaiian Islands.

PIG IRON—Imports the past week aggregate 500 tons. The local market for spot and near-by parcels is unchanged. For shipment from England, prices begin to favor buyers, owing to lower outward freight asked by vessels for this port. The English market is reported strong, with a good demand ruling.

LEAD—The market is steady. Eastern advices report irregular, inactive markets. The fear of foreign importation is against sellers.

COPPER—The market, after hanging around \$10.60 in New York, is beginning to show more strength, with a slight advance established. London cables to Iron Age say: The copper market has been dull, with a fall of about 1 1/2 d. in prices of merchant bars. Depression has been emphasized by reports of financial trouble in Paris and adverse silver fluctuations, the two circumstances causing tired holders to realize, while the uncertainty restrains purchases for "long" account. Consumers are taking supplies very cautiously.

TIN—The market for both pig and plate is dull and heavy. Imported pig is quoted at about 21 cents and Temescal at about 20. The latter is said to be dirty, and therefore does not command full prices. Canners are reported as having their wants in plate well supplied, and their not being in the market, causes quotations to be more or less nominal.

COKE—Imports the past week aggregated 200 tons from Leith. Quotations are reported unchanged.

COAL—Imports the past week aggregate as follows: Leith, 1170 tons; Seattle, 4319; Nauaimo, 6025; Departure Bay, 2660. Total, 14,574 tons. Several changes are made in quotations for both steam and household coals. Blacksmith coal has been advanced several dollars a ton. This is due to prices heretofore ruling netting a loss instead of a profit to sellers. For shipment, English and Australian coals are quoted lower. The decline is undoubtedly due to favorable crop prospects on this coast, causing vessels to seek this port for wheat cargoes. Without some unforeseen unfavorable weather changes the wheat crop this year ought to go well up to 2,000,000 tons.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 28.	WEEK ENDING Feb. 4.	WEEK ENDING Feb. 11.	WEEK ENDING Feb. 18.
Alpha.....	55	60	50	55
Alta.....	50	60	40	45
Adams.....	30	35	70	85
Belcher.....	1.60	2.20	1.40	1.60
Belle Isle.....	3.00	3.50	2.00	2.50
Best & Belcher.....	2.80	3.20	2.50	3.00
Bullion.....	1.25	1.50	1.15	1.25
Bodie Con.....	55	65	70	60
Bulwer.....	40	45	50	55
Commonwealth.....	20	25	30	25
Con. Va. & Cal.....	4.65	6.25	5.12	6.00
Challenge.....	80	1.00	.75	80
Obollar.....	1.25	1.55	1.05	1.30
Concedence.....	2.75	3.25	2.50	2.60
Con. Imperial.....	10	15	10	15
Olealeona.....	35	40	30	35
Crowa Point.....	1.25	1.55	1.15	1.40
Crocker.....	20	25	10	20
Del Monte.....	50	60	75	75
Eureka Con.....	50	60	75	75
Exchequer.....	40	50	30	40
Graud Prize.....	1.50	1.85	1.15	1.40
Gold & Curry.....	1.50	1.85	1.15	1.40
Hale & Norcross.....	2.00	2.40	1.60	1.90
Julia.....	15	20	15	20
Justice.....	30	40	25	35
Kentuck.....	20	30	20	25
Lady Wash.....	60	70	75	80
Mono.....	1.35	2.00	1.75	1.95
Mexican.....	1.35	2.00	1.75	1.95
Navyo.....	40	50	30	40
North Belle Isle.....	30	35	25	30
New Queen.....	15	20	15	20
Occidental.....	40	45	35	40
Ophir.....	3.15	3.50	2.90	3.25
Overman.....	1.15	1.25	1.10	1.20
Potosi.....	2.00	2.50	1.85	2.10
Peerless.....	10	15	10	15
Peer.....	20	25	15	20
Savage.....	1.50	1.85	1.15	1.40
S. B. & M.....	1.50	1.85	1.15	1.40
Sierra Nevada.....	1.55	2.20	1.55	1.75
Silver Hill.....	15	20	15	20
Scorpion.....	25	30	20	25
Union Con.....	1.65	2.00	1.40	1.65
Yah.....	40	50	35	40
Yellow Jacket.....	1.15	1.45	1.15	1.40

* Assessment added.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	NO.	AMT.	LEVIED.	DELINQ.	TAXES.	SECRETARY.
Alki Cons M Co, California.....	10	1c.	Jan 16, Feb 20, Mar 9.....	R Becker, Phelan Block		
Alta S M Co, Nevada.....	41	50c.	Jan 5, Feb 9, Mar 23.....	L Osborn, 309 Montgomery		
Butte Queen M Co, California.....	2	4c.	Jan 28, Feb 27, Mar 28.....	V Gadsden, 119 Bush		
Cal Verde Antique Marble Co, California.....	2	10c.	Feb 7, Mar 7, Mar 28.....	W J Garnett, 335 Pine		
Challenge Con M Co, Nevada.....	10	25c.	Jan 14, Feb 7, March 9.....	O L McCoy, 331 Pine		
Chollar M Co, Nevada.....	33	50c.	Jan 5, Feb 11, March 3.....	G E Elliott, 309 Montgomery		
Con Imperial M Co, Nevada.....	33	3c.	Jan 22, Feb 25, Mar 15.....	O L McCoy, 331 Pine		
Con St Gothard M Co, California.....	4	5c.	Dec 29, Feb 2, Feb 23.....	T Wetzel, 320 Sansome		
Evening Star M Co, California.....	3	1c.	Jan 20, Feb 12, Mar 12.....	J J Scoville, 320 Sansome		
Exchequer M Co, Nevada.....	22	25c.	Jan 23, Feb 25, Mar 17.....	G E Elliott, 309 Montgomery		
Found Treasure M Co, Nevada.....	7	50c.	Jan 19, Feb 24, March 17.....	J W Pew, 310 Pine		
Golden Fleece Gravel M Co, California.....	16	50c.	Jan 30, Mar 24, May 7.....	W J Gleason, Phelan Block		
Gould & Curry S M Co, Nevada.....	63	3c.	Jan 5, Feb 8, March 1.....	A K D rborow, 309 Montgomery		
Gold Mountain M Co, California.....	1	80	Jan 4, Feb 8, Feb 27.....	J D Curtis, 215 Grant Ave		
Gray Eagle M Co, California.....	1	2c.	Jan 11, Feb 15, March 1.....	G D Edwards, 414 California		
Guasacaran and California M Co, B C.....	6	30c.	Feb 9, Mar 15, Apr 5.....	E Oliver, 22 Mint Ave		
Imperial M Co N vada.....	33	3c.	Jan 23, Feb 25, Mar 15.....	O L McCoy, 331 Pine		
Keystone Con M Co, California.....	2	50c.	Jan 31, Mar 7, Mar 28.....	J H Ham, 310 Pine		
Marion White M Co, Nevada.....	2	25c.	Jan 10, Feb 15, Mar 15.....	W J Gleason, 309 Montgomery		
Mexican G & S M Co, Nevada.....	24	25c.	Jan 14, Feb 17, March 10.....	O E Elliott, 309 Montgomery		
Middle Creek G Co, British Columbia.....	4	5c.	Jan 16, Feb 21, Mar 22.....	H D Hawks, 318 Pine		
Northwestern G & S M Co, British Columbia.....	4	20c.	Jan 15, Feb 21, Mar 16.....	F Bonaciani, 438 California		
Occidental Con M Co, Nevada.....	9	25c.	Jan 8, Feb 16, March 10.....	A K D rborow, 309 Montgomery		
Overman M Co, Nevada.....	6	50c.	Jan 10, Feb 15, Mar 15.....	W J Gleason, 309 Montgomery		
Pine Hill M Co.....	1	4c.	Feb 11, March 24, April 15.....	Chas A Hare, Stuart St		
Savage M Co, Nevada.....	78	50c.	Feb 2, Mar 8, Mar 28.....	E B Holmes, 309 Montgomery		
San Francisco M & M Co, California.....	1	2c.	Jan 12, Feb 16, March 8.....	Chas H Osborn, 309 Montgomery		
Sierra Nevada M Co, Nevada.....	101	25c.	Feb 1, Mar 4.....	E L Parker, 309 Montgomery		
Terhoffer G & M Co, California.....	7	10c.	Jan 2, Feb 2, Feb 23.....	W J Garnett, 335 Pine		
Union Con S M Co, Nevada.....	45	25c.	Jan 6, Feb 11, March 2.....	W J Barrow, 303 California		
Weldon M Co, Arizona.....	5	5c.	Feb 9, Mar 15, Apr 14.....	A Waterman, 309 Montgomery		
Yellow Jacket M Co, Nevada.....	50c.	50c.	Feb 2, Mar 4, Apr 2.....	W H Blavett, Gold Hill		

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	MEETING.	SECRETARY.	DATE.
Con Wyoming M Co.....	Annual.....	A W Barrows, 308 Pine.....	Feb 28
Indian Creek M Co, California.....	Annual.....	S O Mills, 419 California.....	March 5

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Ohamond M Co.....	10	T Wetzel, 320 Sansome.....	Aug 15
Cons Cal & Virginia M Co, Nevada.....	10	W J Gleason, 309 Montgomery.....	Aug 17
Copits M Co.....	30	E M Hall, 314 Montgomery.....	Sept 10
Eureka Con M Co, Nevada.....	25	H P Bush, 101 Sansome.....	Jan 5
Great Western Quicksilver M Co.....	25	A Halsey, 328 Montgomery.....	Oct 1
Idaho M Co, Great Valley.....	30	W J Gleason, 309 Montgomery.....	Aug 4
Mayflower Gravel M Co, California.....	1	D M Kent, 330 Pine.....	Aug 20
Pacific Coast Borax Co, California.....	1 00	A H Clough, 230 Montgomery.....	Feb 10
Standard Cone M Co, California.....	10	J W Pew, 310 Pine.....	Dec 22

Ice-Making Machinery.

(Continued from page 129.)

is supplied by this steam, and then it is immediately used for conversion into ice. The extra amount needed is drawn from the boiler. Most machines are worked on such an extravagant system that their engines take more steam than is required for condensing water for ice-making. In the Hercules, the converse is the case. The ice thus made is perfectly pure.

A Hercules model ice plant is shown in one of the cuts printed herewith. An engraving is also given of the engine such as is used on steamships. For stationary work it is differently arranged in some respects. The engine is complete in itself, the power being transmitted to the compressor shaft from a crank placed on the extremity of the main shaft. All portions of the engine are built to standard gauges. The governor is of a very sensitive pattern. In the Hercules compressor, while still preserving the usual vertical position of the cylinders, by one of the simplest and most approved mechanical devices, the rotary motion of the engine is changed into the required reciprocating motion for driving the pumps, all parts being compact and rigid. The compression pumps and pump valves are peculiarly adapted to their special work, and the result of long experience.

One of the cuts shows the Hercules system, as applied to steamship refrigeration, with duplex machine, a double outfit combined in one. It refrigerates by use of the brine system. Should any accident occur, either side may be worked at a time. There are two compressors, two condensers and two sets of expansion coils. The Hercules ice and refrigerating machines are the embodiment of the most advanced knowledge on this subject, gained by the mastery of difficulties as they have presented themselves in actual work.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Refined, in car lots.....	8 @	English, 16 @	20
Powdered, do.....	8 @	Canton tool.....	9 @
Concentrated, do.....	7 @	3 1/2" diam tool.....	9 @
All grades jobbing at advance.....	7 @	Pick & Hammer.....	8 @
		Machinery.....	4 @
		Toe Calk.....	4 @
COPPER.		TIN PLATE.	
Bolt.....	22 @	S. V. steel grade.....	@ 6 00
Sheathing.....	22 @	14x20, sheet.....	@ 6 00
Ingot, jobbing.....	@ 14	Charcoal, 14x20.....	@ 6 00
Do, wholesale.....	@ 13	Do roofing, 14x20.....	@ 6 00
Fire Box Sheet.....	@ 24	Do, do, 20x25.....	@ 13 00
IRON.		COAL.	
Bar, base.....	@ 36	Spot @ B. irreg.....	@ 21
Norway, base.....	@ 42	ular nominal.....	@ 21
PIG IRON.		S. F. COAL.	
Eglington & Co.....	25 @	S. F. T. D. P. R. to 1.....	
Gleugarnock.....	26 @	Cretta.....	7 50
Am. Soft, No. 1.....	25 @	Nannaimo.....	7 50
Oregon Pig.....	30 @	Gilman.....	6 50
Puget Sound.....	30 @	Seattle.....	7 00
Clay Lane White.....	25 @	Copas Bay.....	6 00
Shotts, No. 1.....	26 @	Do, bulk.....	9 00
Langdon.....	25 @	Egg hard.....	14 00
Thornhill.....	25 @	Unnumbered, in sacks.....	15 00
Gartsherrie.....	25 @	Do, bulk.....	10 00
Sarrow.....	25 @	Wallend.....	7 50
Caronbrook.....	24 @	Scotch Splint.....	8 00
BROME IRON ORE.		Brymbo.....	8 00
Perton.....	@ 00	West Harby.....	5 50
LEAD.		TO LOAD PER TON.	
Pig.....	4 1/2 @	Austr lian.....	@ 7 00
Bar.....	4 1/2 @	Liverpool st. am.....	@ 7 00
Sheet.....	4 1/2 @	Scotch Splint.....	7 50 @
Pipe.....	6 1/2 @	Curli.....	7 25 @
SILVER.		COKE.	
(Discount 10% on 500 bag.).....		Lehigh Lump.....	13 00 @
Do, 20 bag.....	1 50 @	Cumberland.....	@ 10 00
Do, 10 bag.....	1 50 @	Egg hard.....	12 00 @
Chilled, do.....	2 30 @	West Harby.....	7 50 @
QUICKSILVER.			
Home trade, per bush.....	@ 43 00	English, to load.....	@ 21 00
For export.....	@ 33 00	Do, spot, in bulk.....	@ 21 00
		Do, in sacks.....	@ 13 00 @

Eastern Metal Markets.

NEW YORK, Feb. 17.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	10 1/2	89 1/2	10 7/8	4 05	19 60
Friday.....	10 1/2	89 1/2	10 7/8	4 05	19 60
Saturday.....	10 1/2	89 1/2	10 7/8	4 05	19 60
Monday.....	10 1/2	89 1/2	10 7/8	4 05	19 60
Tuesday.....	10 1/2	89 1/2	10 7/8	4 05	19 60
Wednesday.....	11 1/2	91 1/2	10 7/8	4 15	19 70

The metal market shows a stronger tone, with sellers generally asking slightly higher prices. Quicksilver is weak at lower quotations. Borax is steady.

Mining Share Market.

SAN FRANCISCO, Feb. 18, 1892.

Outside of continued activity in Hale and Norcross, mining shares have been more or less lifeless, with a gradual shading in prices. The activity in Hale and Norcross is due to the action of the "brokers' combine" forcing the stock pool and mill riots to the past week, yet the "chipping brigade," as the writer can see and learn from usually well-informed parties outside moneyed men are not interesting themselves in the share market, believing that any change in mine management from one set of Comstock managers to another set of Comstock managers is only a subterfuge, and which may result in handing outsiders from the frying pan into the fire. What is required is a complete change in the management of the mines, so as to have them worked to conform to the laws of California under which they are incorporated. Until this be done, and for which the "brokers' combine" is fighting, moneyed outsiders will continue to fight shy of the game that gives the bullion to insiders and assessments to outsiders.

Although Hale and Norcross sold at high prices the past week, yet the "chipping brigade," as the writer can see and learn from usually well-informed parties outside moneyed men are not interesting themselves in the share market, believing that any change in mine management from one set of Comstock managers to another set of Comstock managers is only a subterfuge, and which may result in handing outsiders from the frying pan into the fire. What is required is a complete change in the management of the mines, so as to have them worked to conform to the laws of California under which they are incorporated. Until this be done, and for which the "brokers' combine" is fighting, moneyed outsiders will continue to fight shy of the game that gives the bullion to insiders and assessments to outsiders.

A leading Philadelphia paper says "that John W. Mackay, of the Mackay-Bennett Cable Company, in connection with E. J. Matthews, of this city, and Marshall Field, of Field, Leiter & Co., Chicago, have been very active in Tractor (street cable) stock investments within a comparatively recent period. Other names of importance appear in this movement, but these are probably the most important." The Tractor stock covers the street cable roads in New York, Baltimore, Pittsburg and Chicago. The advance in prices has been quite decided. This deal probably keeps John W. Mackay in the East, but whether his presence here would help mining shares is rather problematic.

Outside mining shares continue flat, stale and unprofitable. The "Rszr Blades" made a sharp up-

Assessment Notices.

KEYSTONE CONSOLIDATED MINING COMPANY.
Location of principal place of business, San Francisco, California. Location of work, Amador City, Amador Co., Cal. Notice is hereby given that at a meeting of the Board of Directors, held on Saturday, the 30th day of January, 1892, an assessment (No. 2) of Two Dollars and Fifty Cents (\$2.50) per share, on the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 310 Pine St. room 43, San Francisco, California.

Any stockholder who shall remain unpaid on the 7th day of March, 1892, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 28th day of March, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.

By order of the Board of Directors
J. H. ISHAM, Secretary.

CALIFORNIA VERDE ANTIQUE MARBLE COMPANY.
Location of principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 21st day of February, 1892, an assessment (No. 1) of One Cent per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the company, 335 Fifth Street, San Francisco, California.

Any stockholder who shall remain unpaid on the 7th day of March, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the eighth day of March, 1892, at the hour of two o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
W. J. GURNETT, Secretary.

Office, 308 Pine Street, San Francisco, California.

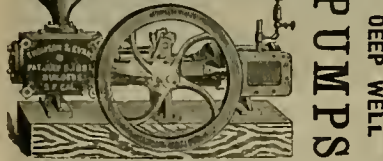
move, but fell back with equal celerity. The Bodie Mining continues to speak encouragingly of the Summit and Bulwer mines, but the shares in the two mines do not exhibit any life even at the low prices quoted.

From the Comstock mines there is uniformly good news from the Middle and North End groups, but the procrastinating character of the work is a dead weight to their shares. The battery assays of ore milled by Con Virginia, last week show a decided falling off, while those of Savage show a marked increase. There appears to be a growing impression that soon after the Savage assessment is delinquent, some of the very important secret work that has been done will be made public as something new, so as to get the public to buy more stock, which, if successful, would allow insiders to make the assessment. Belcher is taking out ore, which is being sent to the mill for reduction. The quantity of ore that is being taken out of Challenge and milled is not given, neither are the assays. Here is an opportunity to push a successful lawsuit. The water in the Gold Hill mines and Alta group of mines is being steadily lowered.

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Ships under advances to smelting works in Boston
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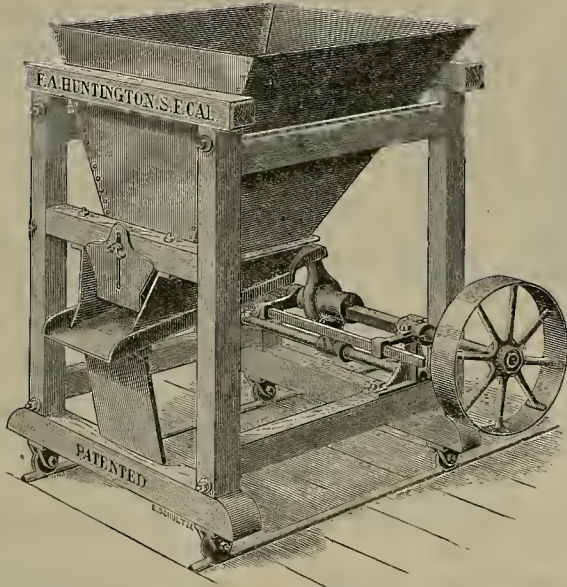
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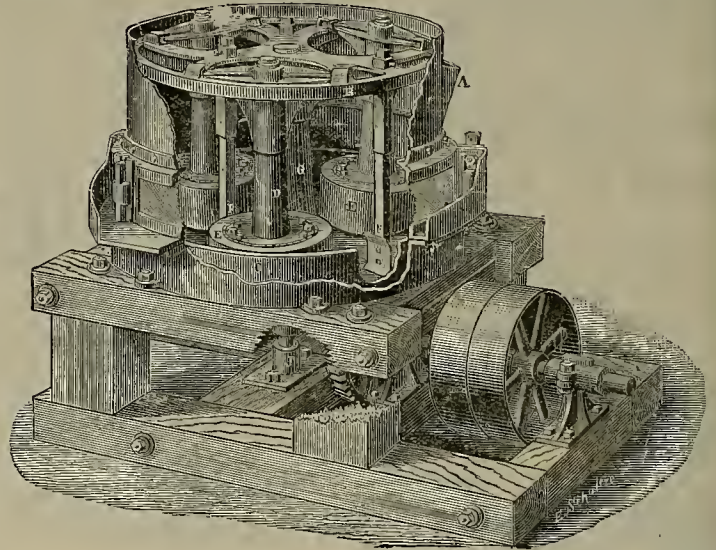
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This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

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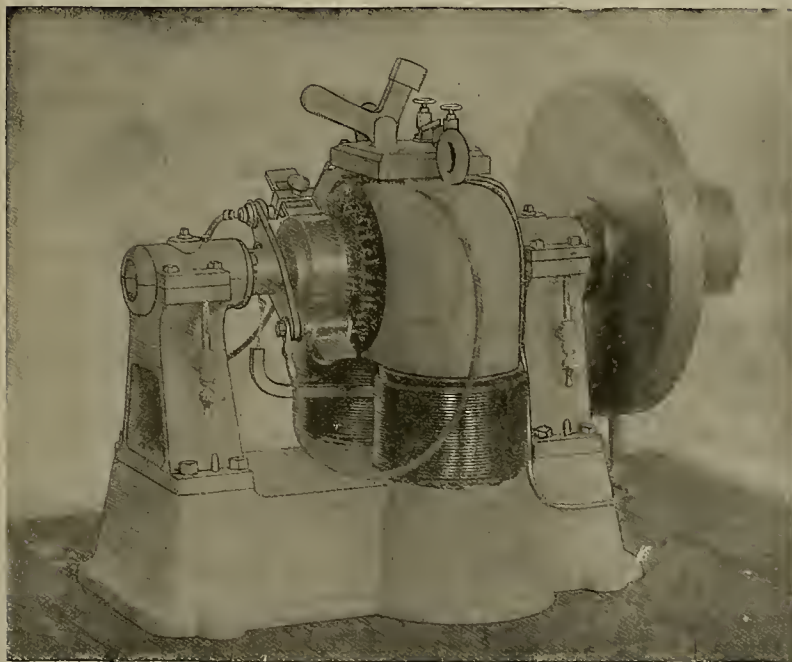
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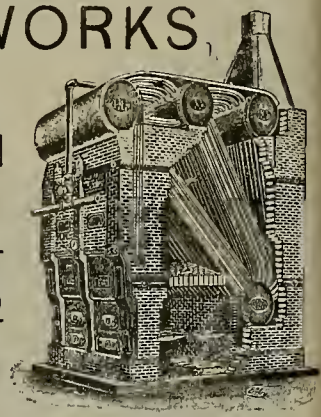
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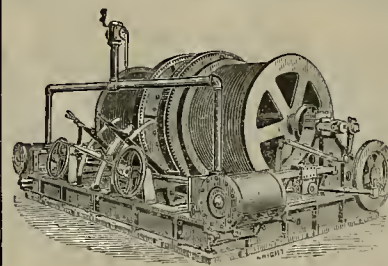
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This is the Most Successful Machine yet discovered for working gravel, cement, clay, etc. It avoids crushing the rocks, which are washed clean, while at the same time it pulverizes the CEMENT or CLAY, and

SAVES THE GOLD ALTHOUGH IT IS AS FINE AS FLOUR.

It is only necessary to have from four to six inches of water to work 100 tons or more every 24 hours.

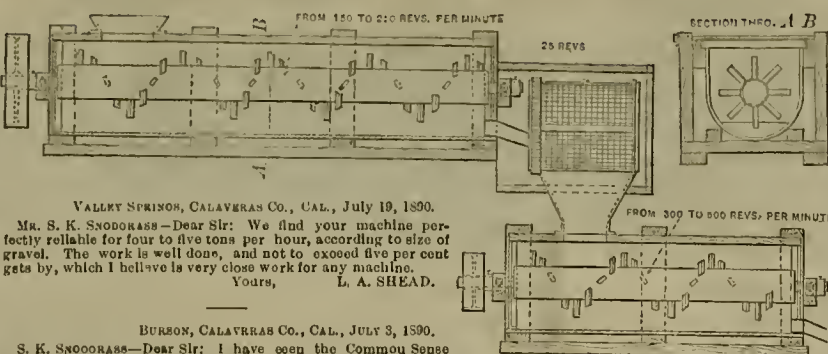
The machinery consists of two iron troughs or "concoaves," each 26 inches in diameter, one of which is about 18 and the other 12 feet long.

In these troughs are strong revolving shafts with projecting teeth, made of steel, two inches wide by three-quarters of an inch thick, placed in spiral form around the shaft, about two inches apart, forming a conveyor.

The first shaft is arranged to revolve from 150 to 250 revolutions per minute, and the second one from 300 to 600.

There is a revolving screen between the two troughs that takes out the coarser rocks after being washed, and only the finer material runs into the second trough, and is there worked thoroughly.

There is a space of about four inches in the bottom of each trough, or "concoave," that fills up with gravel and sand. When the gold is freed it settles into this, and as the teeth do not disturb the bottom, the gold remains there until a cleanup is made.



VALLEY SPRING, CALAVERAS CO., CAL., July 19, 1890.
Mr. S. K. SNODGRASS—Dear Sir: We find your machine perfectly reliable for four to five tons per hour, according to size of gravel. The work is well done, and not to exceed five per cent gets by, which I believe is very close work for any machine.
Yours,
L. A. SHEAR.

BURSON, CALAVERAS CO., CAL., JULY 3, 1890.
S. K. SNODGRASS—Dear Sir: I have seen the Common Sense Pulverizer and Concentrator in operation, and will say that for all kinds of gravel and clay it is the best machine I have ever seen.
Yours respectfully,
A. J. KNAPE.
Miner for 25 years.

PLACERVILLE, CAL., July 15, 1890.
S. K. SNODGRASS—Dear Sir: I have worked with your machine in two counties, and have never seen the equal of it for washing gravel or saving fine gold. I have helped to clean up and found fine flour gold. I have put through it at the rate of 100 tons and over per day, and have also prospected the tailings thoroughly and found no gold in them. I have talked with other parties who have worked with them and say they are a good machine. I have been mining over 25 years.
Very respectfully,
D. G. HUOHES.

VALLEY SPRING, CAL., June 30, 1890.
S. K. SNODGRASS—Dear Sir: I have seen the working of the Common Sense Pulverizer and Concentrator in clay and all kinds of cement, and have examined the tailings, and will state that I have never seen work done by any machine that compares with it. I have seen it when working from 100 to 150 tons per day, and been present when cleanings were made, and seen gold as fine as flour. I would recommend it for using in any kind of placer mining. I have been mining for 20 years.
Yours,
J. D. COOK.

SAN FRANCISCO, March 25, 1891.
S. K. SNODGRASS, Esq.—Dear Sir: In regard to the work done by your machine, which we have had in operation for the past three months, I can say that it has handled successfully all material as taken out of our ground, the only cement which was not perfectly broken up being an exceedingly hard cemented material approaching rock in its hardness.

For all free wash and moderately hard cement it will do very good work, and must effect a great saving in working such gravels and cements, owing to the small head of water required; and furthermore, its great gold-saving qualities, as I am satisfied that fully 95 to 98 per cent of the gold freed in the machine is saved, even to flour gold, and that too without the use of quicksilver.

The automatic rejection of all rocks and material by the revolving screen makes the handling of the gravel cheaper, as all hand culling of the material is rendered unnecessary.
Yours truly,
W. W. B. STEVENS.

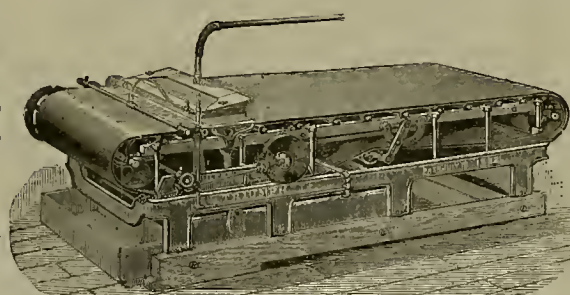
CHILI GULCH, CALAVERAS CO., CAL., July 16, 1891.
Mr. SNODGRASS—Dear Sir: I was down to Spring Valley looking at the machine and it runs very nice and a great deal better than I expected. If you can make them work as well as that one it is the finest machine in the country, and I examined it thoroughly. I have been around gravel mines for the last 30 years.
Yours respectfully,
STEPHEN M. HUOHES.

S. K. SNODGRASS,
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"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frues" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frues" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt . . . \$650 f.o.b.
Price "Triumph" Concentrators, with Plain Belt . . . \$550 f.o.b.



(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Orass Valley, Nevada Co., Cal.
ORASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.
At the Tea (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.
Signed] Sup't North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.

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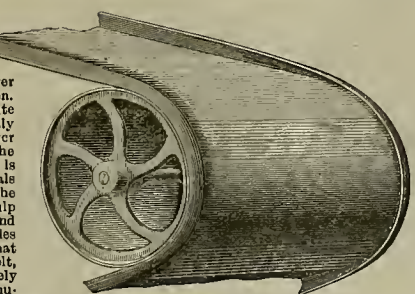
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For SAVING GOLD!
IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
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First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight riffled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight riffles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better belt than has ever been manufactured for use on this coast. It will last much longer and will handle fully one-third more pulp than any smooth belt, and will save a higher percentage of sulphurets.
H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.



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For information concerning this process for the reduction of Ores containing precious metals, and terms of license, apply to
THE RUSSELL PROCESS CO.,
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(A Corporation.)
Constantly on hand a full assortment of Manila Rope, Duplex Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.
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ROCK DRILLING, AIR COMPRESSING,
MINING AND QUARRYING
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Adamantine Shoes and Dies
—AND—
CHROME CAST STEEL
Cams, Tappets, Bosses, Roll Shells and Crusher Plates.
THESE CASTINGS ARE EXTENSIVELY USED IN ALL THE MINING STATES and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.
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H. D. MORRIS, Agent, 220 Fremont St., San Francisco.
Special attention given to the purchase of Mine and Mill Supplies.
Stamp Cam



FRUE ORE CONCENTRATOR

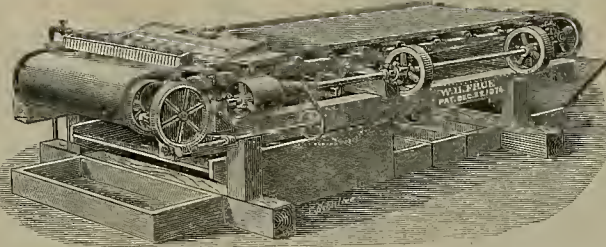
OVER 3000 IN ACTUAL USE.

We are now manufacturing these machines in different styles. The regular Four-Foot Plain Belt Frue Vanner is on the market now in its latest and most improved form, having several improvements on it that facilitate the work, altogether making it a perfect machine.

We are also manufacturing a Four-Foot Frue Vanner with a belt having an improved surface which doubles its capacity. This machine is as perfect in every way as the regular machine, and with its improved belt, it has double the capacity of the ordinary machine. We have sold a large number of these machines, and have demonstrated that they are a success.

The above figures of the number of machines that we have sold tell the tale of their popularity, and show that they have made their reputation by doing their work perfectly.

For any further information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.



Manufactured under Patents of April 27, 1880;
September 18, 1883; July 24, 1888;
and March 31, 1891.

Price of Plain Belt Frue Vanner, \$575, f. o. b.

Price of Improved Belt Frue Vanner, \$825, f. o. b.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., No. 132 Market Street, San Francisco, Cal.

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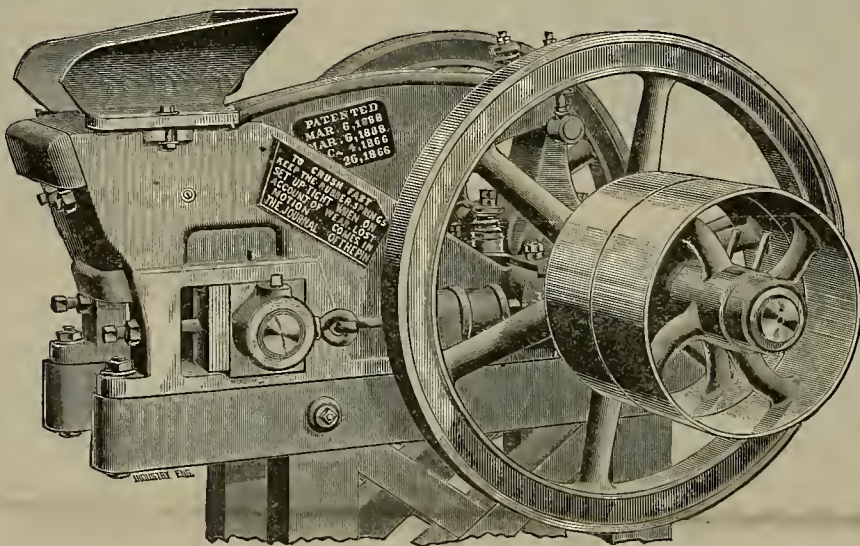
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BULLOCK DIAMOND DRILLS.



DODGE IMPROVED ROCK BREAKER.

INGERSOLL - SERGEANT
ROCK DRILLS,
AIR COMPRESSORS

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COAL MINING MACHINERY.

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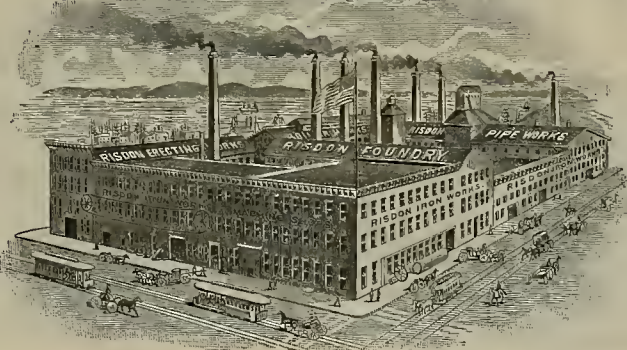
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Mining Matters and Congress.

Although it was supposed by some that the committees from the State Miners' Convention and the River Improvement Convention would accomplish little in Washington, the progress so far made is very good indeed. The joint resolution introduced by Congressman Camminetti of this State has passed both houses, been signed by the Speaker of the House and President of the Senate and gone to the President of the United States for signature. This joint resolution is published in full on page 146 of this number of the PRESS. The Secretary of War is asked to furnish at once estimates of the amounts required which can be spent profitably this year on restraining works for holding back mining debris from the rivers.

The memorial adopted by the State Miners' Convention and indorsed by the representatives of the farming interests has been presented to the Senate and referred to the Committee on Commerce. Senator Felton secured from Senator Frye a promise that the miners' and farmers' commission would have a full hearing before the Committee on Commerce at an early date.

The report that Senator Felton was not taking an interest in the miners' cause is incorrect. Messrs. Searles, Luttrell and Hobson have telegraphed that Senator Felton is using every effort in their favor and believes they will have success.

In fact the whole California delegation has been spurred to unusual effort by the presence of the committees from the conventions of this State. Their presence has shown that the people here are in earnest. The Board of Supervisors, the Chambers of Commerce and the Board of Trade of San Francisco have all passed favorable resolutions which have been forwarded to Washington and will materially assist the efforts of the Congressmen, Senators and Committees.

Altogether the outlook is even more favorable than was expected, and the mining men have reason to be pleased with it.

Electric Mining Machinery.

Electric machinery for mining purposes is being rapidly increased in variety and form. For underground work it possesses several advantages evident to any miner. For surface work also, as in mills and hoists it is rapidly coming into use. One of the engravings on this page shows the Webster, Camp & Lane hoist, equipped with a motor for use in the Ashland iron mine, Ironwood, Michigan. This cut is taken from Mr. Spaulding's paper on "Electric Power Transmission in Mining Operations," quoted several times of late in our columns.

The other engraving shows a large

electric mining pump. The motor takes the place of the usual steam cylinders as shown, and the power to drive it may be

STOP ILLEGAL MINING.—The Executive Committee of the Nevada County Miners' Association has heartily indorsed the reso-

A San Francisco Miners Association.

To still further assist in the firm establishment of the California Miners' Association, a branch was organized in this city on Tuesday, similar to the other county associations. Mr. Louis Glass called the meeting to order. Chas. G. Yale stated that the object of the meeting was to perfect a county organization of mining men and those interested in the mining industry. A very large amount of San Francisco money was invested in mining property in California, and it was proper that the miners' movement should be heartily supported by our citizens. There should be a membership of several thousand in the county associations which it was proposed to establish. The Committee from the California Miners' Association, consisting of Messrs. Yale, Walrath and Church, who were appointed to organize this local branch suggested a list of names for officers, which was read by Secretary Ralston as follows:

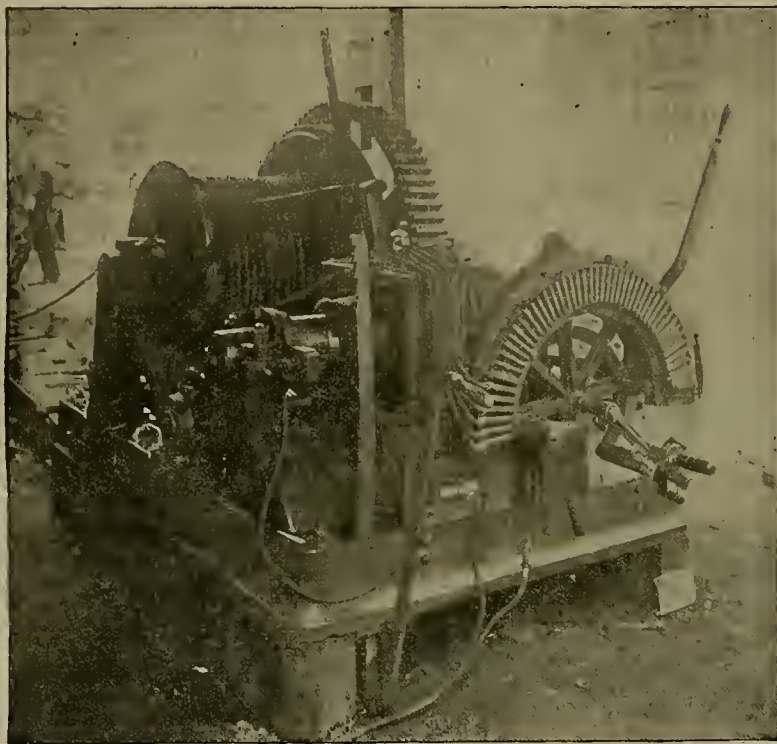
President, Robert McMurray; First Vice-President, J. O. Whitney; Second Vice-President, Robert Watt; Third Vice-President, A. J. Bowie; Fourth Vice-President, G. W. Grayson; Fifth Vice-President, John Taylor; Secretary, Charles G. Yale (of the MINING AND SCIENTIFIC PRESS) Treasurer, The California Safe Deposit and Trust Company; Executive Committee—A. Walrath, I. C. Stump, W. C. Ralston, Thomas R. Church, F. Chappellet, G. H. Sanderson, S. K. Thornton, Robert Sherwood, William Irelan Jr., W. Steinhart, Thomas Price,

James G. Fair, Thomas Bell, H. Pichoir, A. J. Ralston, S. J. Hendy, B. T. Lacy, Charles S. Wieland, J. L. Flood and S. K. Firth. The gentlemen chosen were unanimously elected to fill the various offices.

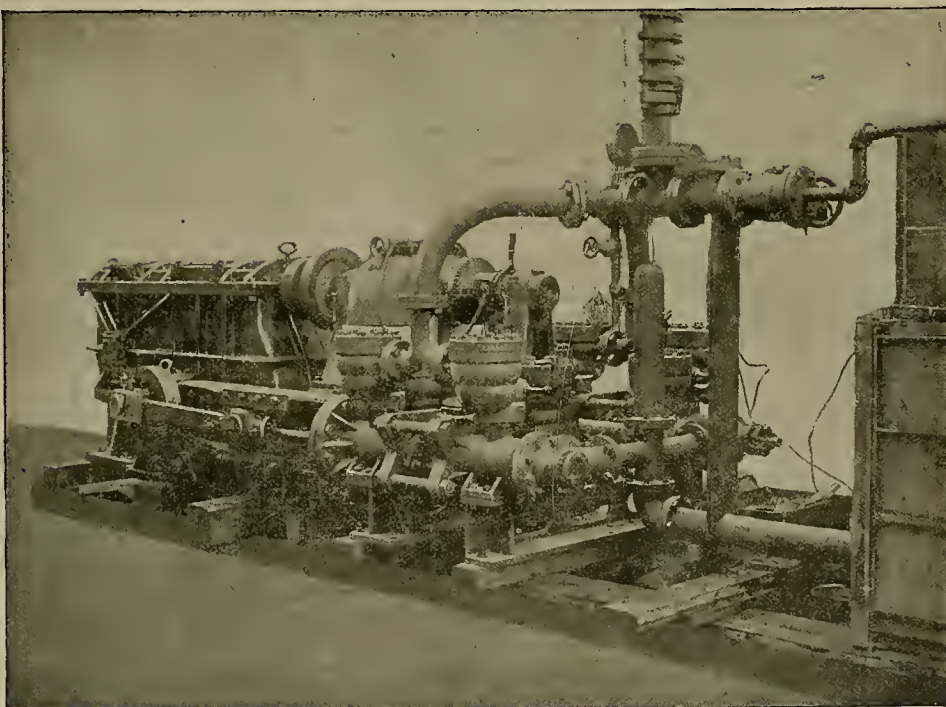
President Robert McMurray then took the chair. Resolutions were passed that the constitution and by-laws of the State Miners' Association be adopted for the new organization, saving the change of name to "The Miners' Association of the City and County of San Francisco." Messrs. Glass, Yale and W. C. Ralston were appointed a committee to draft the by-laws and constitution.

A certificate of organization was then drawn up and signed by those present, and the committee above named was also appointed to canvass the city and obtain as many members as possible.

The telegram from Washington stating that the report that Senator Felton was working against the miners was incorrect, but on the contrary he was supporting them, and the dispatch stating that the House had passed the suggested resolution concerning mining debris in California, were read and received with enthusiasm.



ELECTRIC MINING HOIST.



A MINING PUMP DRIVEN BY ELECTRIC MOTOR.

generated at the surface and conveyed down the shaft by the electric wires. The mechanism for converting the rotary into reciprocating motion is not complex.

lutions of the California Miners' Association with respect to hydraulic miners desisting from operations until Congress can act on the engineers' reports.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ed.

The Comstock Situation.

SAN FRANCISCO, Feb. 19, 1892.

TO THE EDITOR:—We beg to congratulate you on your editorial in the PRESS of Feb. 13th on the Comstock situation. We have known that at all times you were on the side of right and justice, and that with the proper demonstration and proof to you, that you would support us in the fight we have been, and are now, making against the combination that is pillaging the stockholders and looting the mines of the Comstock lode. Never in recorded history has there been such a complete system for the despoliation of trust property as has been put in force by those in control of the mines and mills of that lode. It may be condensed to the following:

1st. The incorporation of the various properties under the laws of the State of California.

2d. The obtaining and retaining control of these properties through the nefarious proxy system of the State of California.

3d. The election of dummy directors of the various corporations who, as has been proven in the Hale & Norcross suit, know nothing of the working of the mine or assist the rascally mill owners to rob the mines for a portion of the plunder.

4th. The milling of the ores from these mines in mills belonging to companies incorporated under the laws of the State of Nevada.

It was a master mind that originated the plan under which this rascality is practiced, and his followers in iniquity are none of those so proficient in the art as the Mephistopheles who worked out the plan of spoliation now practiced. To tell the truth, they are petty larcenists compared to him.

That you may better realize the profitable nature of the calling of these petty larceny mining millionaires, we quote you from the testimony of D. B. Lyman, superintendent of the Consolidated California & Virginia Mining Co., given in the Hale & Norcross case yesterday, under cross examination by W. T. Baggett, attorney for plaintiff. The following was developed:

Q. If 1259 tons of ore, car sample assay value of \$72.12 per ton, total value \$113,518.41, was sent to the mill, and the milling company only returned \$40,471.50, would you consider that ore properly milled?

A. Assuming everything correct, I would not.

(Objection being made to style of question, Mr. Baggett put next as follows:)

Q. If you owned the Hale & Norcross mine, and you shipped 4579 tons of ore, value at the mine car sample assay \$48.33, total value \$221,303.07, to the mill, and the mill returned you \$90,535.12, would you be satisfied with that return?

A. No.

Q. If you sent 3973 tons, car sample assay value \$222,711.30, and the mill returned \$78,097.77, would that be satisfactory?

A. No.

Q. How much would you expect from that ore?

A. I would have expected at least 65 per cent of the car sample assay value.

These figures represent the shipments of the ore of the Hale & Norcross Mining Co. as follows:

December, 1887, 4579 tons	\$221,303.07
February, 1889, 1259 tons	113,518.41
April, 1889, 3973 tons	222,711.30

Value car sample assays\$557,532.78

According to the testimony of Lyman, who was introduced by the defense as an expert, the company should have received 65 per cent of this amount, which would amount to \$362,396.30. According to the records of the Hale & Norcross Co., they received as follows:

December, 1887	\$90,535.12
February, 1889	40,471.50
April, 1889	78,097.77

Total\$209,104.39

This shows a loss of \$153,291.91, which was stolen from the Hale & Norcross Mining Co. during the three months mentioned by the thieves who own the mills that crushed the rock. Is it astonishing that under such circumstances the mining interests and the stock business have gone to ruin? The figures given are all taken from the records, and we have plenty more of the same kind at your disposal and for your information.

You are right when you say these conspirators should be in the penitentiary. They have posed long enough as millionaires, and should take their places as felons where they belong.

J. H. TINGMAN, Sec'y
Mining Stock Association.

An Old Suggestion for a Convention.

SAN FRANCISCO, February 18, 1892.

TO THE EDITOR:—On the 18th day of February, 1884, just eight years ago to-day, while connected with the State Mining Bureau, I received a letter from Mr. John Hemsley, a well-known Placer county miner, to which I was expected to reply officially.

I had recently returned from a very careful reconnaissance of the hydraulic mining region, and the low lying lands injured by the mining debris, and had given the subject much careful consideration.

In answering Mr. Hemsley's communication, I took occasion to express my honest convictions; bearing in mind that the office I held was established for the express purpose of furnishing information to the miner, my reply was carefully written.

My letter proved an offence to the agriculturists. I wrote:

If the production of gold and silver in California should cease to-day, ours would still be a great and prosperous State as New York is now, but there would follow a period of depression which would probably last for years, until our people acquired new habits of economy and industry. To suddenly stop any great industry, would react against all classes.

But the greatest offense I innocently committed, was to propose a convention of miners and farmers and an appeal to the Federal Government, in the following words:

I am of the opinion that a convention of miners and agriculturists should be called to discuss this question, and to devise plans to overcome the undisputed inconvenience and injury to the farmers caused by hydraulic mining. It is my present opinion that the General Government should step in and aid in the settlement of this most important question in which all the people are interested. The gold of California was an important factor in the hands of the Government during the time of sore adversity of the nation, and would be again under similar circumstances. The whole country should give this matter attention, for it is a national question. What takes place in California must follow in time in other States and Territories, for which reason it is my opinion that the serious attention of Congress should be called to the subject by the people of California, and that body be asked to appoint a commission to investigate and suggest some relief for the troubles, both of the miner and the agriculturist, which have become very serious.

Why there should be any objection to this proposal I could never understand, as it seemed to me the most reasonable and sensible thing for men to do. I have often since questioned in my own mind whether I was really deserving of censure in proposing what has recently been done. If I have ever been sincere in anything, it is my friendship for the miners of California.

Some of the valley papers, impugning my motives, made my letter a personal grievance. The *Daily Appeal* of April 2 was pleased to say:

Henry G. Hanks, State Mineralogist, has published a long and useless article in defense of hydraulic mining, in which he not only promulgates the most extravagant views in regard to the necessity of gold production in California, but manifests the impudence to suggest a convention of the farmers and miners to discuss a compromise. We say this is impudence; it is certainly the coolest kind of a proposition to ask farmers to meet hydraulic miners for the purpose of discussing a compromise, when any character of a compromise would be nothing less than an unconditional surrender of the Sacramento valley to hydraulic mining for dumps. He may induce some over confident hydraulic miners to call a convention, but no one will attend but miners. * * * The hydraulic man who talks about compromises when slickens rises about the farmer's neck, is a debris Bourbon of the worst kind.

The *Daily Bee* of March 31 published the following:

Mr. Hanks gives no answer to the question relative to drift-mining, but suggests that a convention of farmers and miners be called to discuss the question and devise plans to overcome the undisputed inconvenience and injury caused by hydraulic mining. This is an old suggestion and one that has often been made and rejected. Any convention of this kind is wholly impracticable; it could only result in nothing, and if it could reach any conclusions, nobody would be bound by its act.

The *Sutter County Farmer* of April 4, devoted considerable space to the utter condemnation of the letter in full, from which the following are extracts:

He advises the holding of a convention of farmers and miners to patch up a compromise. * * * He also wants a Congressional commission. What for? Is it to turn the monitors loose upon an offending people? This we think is implied in the scheme. * * * In conclusion, he explains himself under nine different divisions, all of which are fallacious, and one of which is actually wicked. Here is one: Seventh.—There are large tracts of land in California which can be used for agriculture, where no mining is likely to interfere. To make plain what is meant read: Eighth.—The area on which placer gold can be profitably mined is limited. This language is susceptible of but one construction: it means a surrender of the Sacramento valley to the uses and requirements of the hydraulic miner.

This editorial concludes thus: Professor Hanks, State Mineralogist, henceforth is clearly entitled to the credit of having uttered the most atrocious sentiments yet written, and brands him as an enemy of law, order and civilization.

I do not quote these criticisms in malice,

but as a matter of history. I felt hurt at the time, knowing that the strictures were unjust, but I have had the satisfaction of noting a gradual change of sentiment, and an awakening of the people to a sense of the true interests of the State.

Early in 1888, Congress passed a bill appropriating \$10,000, and detailing three officers of the Engineer Corps of the United States army "to make a thorough examination and investigation of the mining debris question in California." In December of the same year, the commission established headquarters in San Francisco and commenced operations. Their report and those of others who had examined the Bay of San Francisco and the California rivers, proved that I was not wholly in error when I wrote, "It is not fair to charge the miners with the total filling up of the rivers, which is an operation ever going on," etc., etc.

I have not changed my opinion as to the policy of taking out all the gold we can, and while we can. I do not disparage the farming interests, but it is still my belief that we cannot maintain the highest condition of prosperity in California by agriculture alone.

Since gold-mining has been restricted, and in some cases interdicted, there has been a proportional depression which miners have found hard to bear. The farmers, too, have felt this depression, and are also incommoded by scarcity of money. Crops are large, but the market is limited, and they are sometimes compelled to part with their products at a price which leaves but little margin for the labor and investment. I do not attribute this wholly to a reduced output of gold, but I am convinced it is partially the cause.

The former almost phenomenal prosperity of California will return when we become, as we may, an agricultural, mining, manufacturing and commercial community. All the resources of the State should be fostered and cherished. When the mining convention was called, I felt that a new era was about to be inaugurated; I watched the progress of events with great interest. But when, on the 20th day of January, the editor of the *Sacramento Bee* made his admirable address, using the words, "We have come down to say to you that we want to bridge over the chasm," I began to think the millennium was at hand. I was reminded of the fact that the American people decide in favor of the right if time enough is given to them, and while I regret the loss of time, and feuds of the past, I am prepared to say with Shakespeare, "All's well that ends well."

HENRY G. HANKS.

The New Reservoir.

Secretary Englebright informs the *Union* that the work of constructing the company's new reservoir on the South Yuba, above Bear Valley, is to be resumed this season and carried to completion, but it will probably be the 1st of June before active operations can be commenced, as at the present time the snow is about six feet deep in that country. The dam was built about one-half the height it was intended to be last season, and when completed it will hold sufficient water to cover 200 acres of ground. Last season the company reopened and repaired the old ditch from Bear Valley to Gold Run, which had been out of use for a number of years, and this season this ditch is to be extended as far down the divide between Bear river and the north fork of the American as Colfax, in order to furnish water for irrigation. Another year the line will be extended below Colfax and to a connection with the company's Bear River and Auburn canal, and by this means a good system of canals will be perfected reaching from the mountains to the lower portion of Placer, and into Sacramento county.

THE GEOLOGICAL SURVEY.—Some weeks ago it was announced that the Cuvier annual prize of 1500 francs for the greatest scientific service done to the world during the past year had been voted to the United States Geological Survey by the French Academy. Major Powell of the Survey returned the money in a letter, saying that such prizes ought to go to meritorious individuals rather than to Governments or Governmental institutions. He asked the Academy to send a gold medal instead, and to add the unexpended balance of the prize to the next annual premium to be awarded. Major Powell has just received a letter from the Secretary of the Academy, M. Daubrie, stating that a commemorative medal would at once be struck, and expressing the hearty thanks of the Academy for the suggestion, which betokens the cosmopolitan generosity, as well as the enlightenment of the Bureau. M. Daubrie remarks incidentally that no region of the globe has witnessed such scientific discoveries within the last 25 years as have been made in the United States.

Mining Matters in Congress.

Debris in California.

Representative Caminetti on the 1st inst. introduced in the House of Representatives the following measures:

House Resolution No. 78—Read twice, referred to the Committee on Mines and Mining. Joint Resolution, concerning mining debris in California, and requesting certain estimates from the Secretary of War.

WHEREAS, Under the provisions of an Act, approved October 1, 1888, a Commission, composed of members of the Engineer Corps of the United States Army, was appointed to investigate the mining debris question in California; and, whereas, said Commission devoted a great deal of time to the examination of the country and rivers affected, and in gathering data to enable it to report a plan of action; and, whereas, the report of said Commission has been submitted through the Secretary of War, and among other recommendations therein appears the following: "It is proposed to improve the rivers, first, by restraining the debris now lodged in the canyons of the Yuba and Bear, and in the plains below, by dams and other restraining works; second, by contracting the widths of the rivers by brush wing dams in their beds. The estimated cost of these improvements is: Feather river wing dams, \$300,000; Sacramento river wing dams, \$300,000; dam on Yuba river at De Guerre Point, according to height, from \$300,000 to \$640,000; dam in Bear river at Van Giessens, \$150,000; restriction works on Yuba river below foothills, \$300,000"; and, whereas, notwithstanding that said report absolutely shows the existence of "vast deposits of material lying in the canyons and in the plains below the foothills, portions of which will be carried down during floods and eventually lodge in the streams," no estimate was made by the Chief of Engineers to commence that system of improvement required to restrain the mining debris where now lodged; and, whereas, it seems from said report to be a necessity so to do without delay in order to prevent its final lodgment in the navigable streams, causing incalculable damage, and also in order to make effective the expenditure of money in improving the Sacramento and Feather rivers; therefore be it

Resolved, By the Senate and House of Representatives of the United States of America in Congress assembled, that the Secretary of War be, and he is hereby, requested to submit for the consideration of Congress such further estimate of the amounts required, and which can be spent profitably during the coming year, in making the improvements recommended by said Commission to restrain said mining debris and prevent its lodgment in the navigable rivers.

A DEPARTMENT OF MINES AND MINING.

House Resolution No. 5161—Read twice, referred to the Committee on Mines and Mining. A bill to create an Executive Department of Mines and Mining.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled: That there shall be at the seat of Government an Executive Department to be known as the "Department of Mines and Mining," the general design and duties of which shall be to acquire, by examination, practical and scientific experiments, geological research, or otherwise, useful information on subjects connected with mining in the general and comprehensive sense of the word, and to diffuse same among the people of the United States.

SEC. 2. That said department shall be under the supervision of a Secretary of Mines and Mining, who shall be appointed by the President, by and with the consent of the Senate; and Section 158 of the Revised Statutes is hereby amended to include such department, and the provisions of title four of said Revised Statutes, including all amendments thereto, are hereby made applicable to said department.

SEC. 3. That there shall be in said department an Assistant Secretary of Mines and Mining, to be appointed by the President, by and with the advice and consent of the Senate, who shall perform such duties as may be required by law, or prescribed by the Secretary thereof.

SEC. 4. That the Secretary of Mines and Mining shall receive the same salary as is paid the Secretary of each of the Executive Departments, and the salary of the Assistant Secretary of Mines and Mining shall be the same as that now paid to the First Assistant Secretary of the Department of the Interior.

SEC. 5. That the duties now imposed by all laws and parts of laws relating to mines

and mining affairs exclusively, upon any existing department of the Government, or any division or bureau thereof, shall, on and after the day this Act takes effect, be performed by the Department of Mines and Mining.

SEC. 6. That the Geological Survey and the Bureau of the Mint are hereby transferred to the Department of Mines and Mining.

SEC. 7. That the sale of the mineral lands of the United States shall be conducted under the auspices of the Department of Mines and Mining.

SEC. 8. That on the organization of this department, all officers and employees wholly engaged in official work in any department of the Government, or any division or bureau thereof engaged in the performance of the duties referred to in Section 5 of this Act, and all such employed in the departments referred to in Sections 6 and 7 hereof, shall be transferred to the Department of Mines and Mining.

SEC. 9. That all records, maps, documents, instruments, surveys, machinery and other materials now in the possession and use of any existing department of the Government, or any division or bureau thereof referred to in Sections 5, 6 and 7 of this Act, are transferred to the Department of Mines and Mining.

SEC. 10. That this Act shall go into effect on the 4th day of March, 1893.

Oil Wells at Puente.

The question of cheap fuel seems likely to meet with a speedy solution from more sources than one, says the *Pomona Progress*. We recently published an account of a rich find of brea in the hills near Los Angeles, that is said to be of such a quality as to make excellent and inexpensive fuel. Then, too, the San Antonio Electric Light and Power companies and other electric companies that are being organized in different places, expect to furnish power cheaper than it can be obtained by the use of fuel. In addition to all this, there seems to be an inexhaustible supply of oil in the hills south and west of this place.

Members of the oil firm of Chandler & Fonda say in regard to the Puente oil field: "We have two oil wells on our land which is in the Puente hills. One well we have down 675 feet and is in an 8-barrel well. The other well is down 400 feet and is not yet on the oil contact. An 8-barrel will net a profit of about 15 barrels per day. All our oil is taken by the Whittier school. We own about a mile of land along the oil belt, and there are thousands of tons of asphaltum in sight. We get \$2.25 per barrel for the oil and sell all we can get up. The demand is greater than the supply. Three barrels of oil is equal to a ton of coal, and I predict the time will come when oil can be put on the market in Los Angeles for \$1 per barrel. This will make the value of a ton of coal in Los Angeles \$3, and it will solve the fuel question so far as manufactures are concerned.

"The hills of Puente are reeking with oil. Such a thing as a dry well has never been known. There are 22 wells in that belt now. One who has not visited those hills has no idea of the quantity of oil there is in them, even appearing upon the surface. One of our boys last week dug a hole 30 inches deep with a pick and shovel. He extended it into a little trench, laid a pipe in and put a 5-gallon can under the pipe at the end. In six days he got 35 gallons of oil. Years ago, prospectors were looking over that ground, and seeing this asphalt, thought it was coal. They sunk a number of shafts four feet square all over the hills, and after they had got down 10 or 15 feet and found nothing but this black oil, they gave up the job. Many of those black holes have been there 10 years, and I'll wager you will find as high as 20 barrels of oil in many of them. Three or four wells can be worked as cheaply as one well. What is needed is capital. If those hills were in the East, all the money necessary to develop the oil could be raised without difficulty, but it is not so in California. Los Angeles need never worry over the fuel problem. Just as soon as fuel is wanted, it can be had right at our doors, the cleanest, cheapest fuel in existence, except natural gas."

PLACERS.—A dispatch from Tucson, A. T., dated Feb. 18th, says: To-day one of the biggest gold nuggets ever seen here was brought to Tucson. A week ago a Mexican, while walking along the placer diggings at Quijotoa, which had been washed out by the late rains, saw the gold—a dingy yellow lump—sticking out of the sand and kicked it loose. The value of it is about \$200. It weighs 11 ounces. Smaller nuggets were also found.

An Important Mining Decision.

The following decision of the Secretary of the Interior regarding the legality of relocating mining claims is of great importance to many. By this is shown that every proof can be made and filed, but if there is failure upon the part of the applicants for patent to pay the amount due the Government, then all assessment work must be done the same as if no application for patent had been made, otherwise the claim is open to relocation. Secretary Noble says:

On the 12th of June, 1884, the Belyoir Mill and Mining Company, a corporation, filed in the local Land Office at Sacramento, California, its application for patent for the Belyoir lode and mill site, lots 61 A & B, in T. 12 N., R. 8 E., being mineral application No. 1410, and furnished all the evidence necessary to entitle it to make final entry.

On the 2d of April, 1889, Luke Ferguson, the plaintiff in this case, filed with the Recorder of Placer County, California, the county in which the claim is situated, a notice of location of the Boulder lode claim, which, in effect, is a relocation of the Belyoir lode claim.

On the 21st of May, 1889, he applied to the local office for a hearing to determine the truth of his allegations that the company had abandoned its claim, and had failed to do the required assessment work thereon for over two years, and he asked for the cancellation of its application for patent. The local officers thereupon ordered a hearing to determine whether or not the said company, by failure to comply with the law, had abandoned its claim under its application for patent, and whether Ferguson was entitled to make entry as a relocater.

After the taking of considerable testimony at the hearing, and after the contestant had closed his case, the company made a verified application for a continuance, and for a commission to take the testimony of certain absent and material witnesses. The continuance was granted, but not the commission, and from the refusal of the local officers to grant the commission the company sought to appeal to your office. The local officers held that their order denying the commission was interlocutory, and no appeal could be taken therefrom, but consented to forward the application for a commission, and the attempted appeal from their decision thereon, to your office for consideration.

When the date to which the case was continued arrived, the contestant appeared with additional witnesses. The company protested against the allowance of any additional testimony during the pendency of its appeal to your office, from the decision of the local officers refusing its application for a commission. The local officers overruled such protest, heard the testimony offered by the contestant, and on the 10th of December, 1889, united in a decision holding that mineral application 1410 should be canceled.

From this decision an appeal was taken to your office, and the record in the case was received by you on the 13th of February, 1890. After examining it, you decided that the local officers erred in denying the company's application for a commission, and without considering the case upon its merits, you returned the record to the local office on the 28th of March, 1890, with instructions to those officers to issue a commission to some competent and suitable person in San Francisco to take the depositions of the witnesses named, and to render their decision upon the completed record, and report to you as required by the regulations.

These instructions were complied with, and on the 9th of June, 1890, the register and receiver rendered their second decision in the case, in which they reached the same conclusion as in their first, and held "that mineral application 1410 be canceled." From that decision an appeal was taken to your office, and on the 18th of October, 1890, you affirmed the same. A further appeal brings the case to this Department for consideration.

The evidence in this case presents several peculiar and unusual features. A company which had expended between 20 and 40 thousand dollars in developing its mine and carrying on its business, failed to make the payment of \$65, which should have accompanied its application for a patent. When it was discovered that this payment had not been made, the amount was tendered to the local officers, who declined to accept it on account of an intervening adverse claim. Under the belief that this entry had been completed, the company suspended its underground mining operations in Decem-

ber, 1886, and shut down its mill in February, 1887, for the reason that it was not capable of doing the heavy work required.

Numerous experiments satisfied the company that to work the mine profitably, a more powerful mill was necessary, and it decided upon the removal of the old, and the erection of a new one. During this time the work and expenditure upon the mine required by Section 2324, Revised Statutes, was not performed and made, and in accordance with the provisions of that section, the mine became open to relocation. Of this circumstance Ferguson took advantage, and made his relocation on the 2d of April, 1889.

It was not until this relocation that the company became aware that its entry was defective, on account of the non-payment of the \$65 already mentioned. This payment is one of the requirements enumerated in section 2325, Revised Statutes, to be complied with before a patent can be obtained.

From the evidence in the case you find that the company did not intend to abandon its claim, but that its failure to perform the labor and make the expenditure each year required by section 2324 of the statutes, resulted in an abandonment, and rendered the mine open to relocation. I am compelled to concur in that conclusion. The facts are clear, that from the early spring of 1887, to the time of the relocation, in April, 1889, the company neglected to perform any labor or work, or make any improvements on said claim. It did not even remove the old mill, preparatory to building a new one, but sold it, and the purchaser did the removing. This neglect on its part was in the belief that its entry was complete, and that it could safely discontinue its operations, but this was a mistaken belief, growing out of the neglect of its own officers.

Upon the facts in the case the local officers found against the company, and you concurred in their judgment. In the case of *Creswell Mining Co. vs. Johnson* (8 L. D., 440) it was held that "concurring decisions of the local officers and General Land Office on questions of fact, will not be disturbed by the Department unless clearly against the weight of evidence." I find no such situation in the case at bar, and the decision appealed from is therefore affirmed.

The Idaho.

California's Representative Gold Mine.

A correspondent of the *Sacramento Record-Union*, writing from Grass Valley, Nevada county, says:

I donned a suit of rubber clothes, stepped into the cage, and in less than two minutes was 2000 feet beneath the sod. Six feet is all that the man who "shuffles off this mortal coil" asks for, but he who is following the fickle goddess in her dips, spurs and angles, stops not as long as machinery can keep his shaft free from water, and a gold-bearing quartz vein is in sight.

Two thousand feet! The deepest gold mine in the world, the Idaho, one that has made many millionaires, and to-day is the greatest gold producer on the continent!

The *Grass Valley Evening Telegraph* a few evenings since contained the following item:

"On Monday evening the Idaho Mining Company declared a dividend of \$1 per share on the capital stock. This makes 260 dividends declared by the company. The mine is looking well throughout, and is destined for a long life yet."

Two hundred men are employed in extracting the rich body of ore. The shaft is almost vertical, but the machinery is of such a stable character that one trusts himself to the yawning dark depths with little or no fear of accident. Many men, however, have gone down in the Idaho with the full vigor of manhood, who were taken out bleeding and mangled corpses. More men have lost their lives in this richest of all gold mines in the world than in any other similar working in the State.

Three dollars a day. It is good wages, and the man who keeps steadily at it supports his family well, educates his children and lays aside a snug little sum for old age or a rainy day. The neat little homes of the Grass Valley miners indicate a degree of prosperity seen in but few places upon the coast.

County Surveyor Uren, who knows the value of every mine in the district better than any other individual, who has surveyed all their tunnels, drifts and stopes, says that the Idaho is a mine that, in all probability, will pay dividends to its fortunate owners for many years.

It is owned by Edward Coleman, John C. Coleman of Grass Valley, Judge Miles O'Connor of San Jose, and Geo. D. McLaine of San Francisco. It has produced

over \$13,000,000 in bullion, more than two-thirds of which has been profit to the fortunate owners. Edward Coleman is superintendent, and one of the best posted miners on the coast. He made a start at Iowa Hill in gravel mines in the early fifties, and has always been successful in his mining operations.

The Idaho is situated on the south side of Wolf Creek, one mile south of Grass Valley, at an altitude of 2,550 feet. The course of the vein is east and west, with a dip to the south, varying from 55 to 73 degrees. During the years of 1889 and 1890, 39,225 tons of ore, valued at \$20 per ton, were extracted.

It may be stated that there never has been a time since quartz mining began in the Grass Valley district, 42 years ago, but that one or more quartz mines have been worked at a profit, while a similar statement cannot be made of any other mining district on the Pacific Coast. From the best obtainable data, it is estimated that the quartz mines of Grass Valley have produced over \$100,000,000 in gold bullion. This is sufficient to indicate the value and permanence of the quartz lodes of the district and its mining prospects for the future.

The Idaho mill has 40 stamps, 16 concentrators, and the finest water power in the county, having a pressure of over 500 feet. John Carter, an experienced miner, has been foreman for years.

A sketch of the Idaho, without reference to the Eureka, would be like writing "Hamlet" with the Dane left out. The Eureka was located in 1851, just across Wolf Creek from the Idaho, and worked by different parties with poor success, the ore near the surface being low grade. In 1865 the mine was sold for \$400,000, and the Eureka Company was incorporated. The mine had only been developed on the surface. The new company sent down a shaft, and in the next two years took out \$1,200,000, and the mine continued to pay large dividends for years. Its dividend record was \$2,134,000, and its pay chute dropped into the Idaho and the Colemans got it.

The Eureka was so rich that extensions were considered valuable. Judge A. B. Dibble—well known in Sacramento—the leading attorney in Nevada county to-day, was one of the original locators of the Idaho, and at one time owned a controlling interest.

William Watt, the leading man in the Eureka, did not think that the pay chute passed into the Idaho, and he advised Dibble to sell, which he did. It was the advice of a friend and Dibble hastened to get rid of his stock. That advice cost the Judge some millions, but he treasures no ill-will toward his adviser, whose memory is revered in Grass Valley, and as a token of respect for the dead they have erected a magnificent monument to the big-hearted miner who never took advantage of any one and whose purse-strings were always loosened for charity.

GEOGRAPHICAL SOCIETY.—William L. Merry read a paper before the Geographical Society on Wednesday evening of last week entitled "The Nicaragua Canal—Its Geography and Technique." The annual election held on the same evening resulted as follows: Pres., Prof. Geo. Davidson, A. M., Sc. D., F. R. G. S.; Vice-Presidents—T. E. Slevin, LL. D., Justice Ralph C. Harrison, Rev. Robt. Mackenzie; Treas., Harry Durbrow; Home Corresponding Secretary, Jeremiah Lynch; Foreign Corresponding Secretary, Dr. P. W. Poulson; Recording Secretary, John Partridge; Board of Directors—Prof. Geo. Davidson, A. M., Sc. D., F. R. G. S., Thos. E. Slevin, LL. D., Harry Durbrow, John Partridge, Louis L. Nelson, A. S. Lowndes, C. L. Taylor; Council—Jeremiah Lynch, John Dolbeer, J. V. Coffee, Rev. Robt. Mackenzie, Wm. L. Merry, Charles Goodall, F. S. Cook, M. D., Mark Sheldon, Wm. Hood, C. E., P. W. Poulson, M. D., Justice Ralph C. Harrison, C. L. Taylor.

ANOTHER MINING ELECTRICAL PLANT.

An electric-lighting and power plant has just been put up at the Cargo Muchacho mines on the Colorado river, a short distance above Yuma. The mills, offices, boarding house and other buildings are lighted up with 16 and 32 candle power lamps. The same dynamo that furnishes this light, also furnishes power for electrical-hoisting machines. One of the machines is placed in a drift 550 feet below the surface.

THERE are not very many "kickers" over the amicable agreement between the two great interests of the State, but there are a few on both sides. Some people have been fighting so long that they do not want peace on any terms.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

MOORE MILL.—Amador Ledger, Feb. 20: S. W. Bright is negotiating for the lease of the Moore mill for the purpose of putting it in order and crushing the rock from his Bell Wether claim.

QUARTZ MOUNTAIN.—Cor. Amador Ledger, Feb. 20: The old mountain still looms up. Several changes have been made lately around mine and mill. Wm. Ford is now superintendent, and Mr. Hoskins foreman of mine, with Sterling Hammack in charge of the mill. Frank Pixley, who is largely interested in the operations, pays us a flying visit occasionally. Negotiations are in progress to open up more mines in this vicinity.

Colusa.

SALT.—Colusa Sun, Feb. 20: Articles of incorporation were filed to-day of the Antelope Crystal Salt Company. The directors are: J. P. Rathbun, P. Peterson, W. P. Harrington, W. S. Green, Geo. B. Harden, P. H. Graham and R. DeLappe. Liverpool salt is the purest known to commerce, but that made of water belonging to this corporation is four per cent purer than the best Liverpool. The location of the works will be on the farm of Mr. Peterson, about three miles north of Sites, and the Colusa and Lake road will run to it. Salt was made at this place over thirty years ago, and it was pronounced good, but it was not pushed with energy, and the temporary works were abandoned. Some months ago J. P. Rathbun leased the ground and began making salt. He developed the fact that water from 23 to 40 per cent salt could be had in unlimited quantities; also that the supply of natural gas was very great, much greater than could ever be needed for fuel to make the salt. He made the summer before last several tons of salt, and last summer ten or twelve more, and made it with a small outlay and a small amount of labor. Salt worth \$25 a ton in the market can be made for \$4 or less, and the manufacture need only be limited by the demand. It is located where transportation will be very cheap. Coal oil is always found with strong salt water, and there is every indication that oil can be had with little expense. The formation just at that place is different from that found at any other place in the Coast mountains. The "dip" of the sandstone rim to the basin is to the east on one side and to the west on the other side—the crests coming towards each other.

Inyo.

THE PROSPECTS.—Inyo Independent, Feb. 16: It is now an assured fact that the ore output from Darwin will be greater this year than at any time since the flush days. The dead work in the Independence mine is now completed, and ore is now being taken out, as is also the case in the Defiance. By means of the improvements recently effected in the former mine, men can now work with no danger to their health. The water supply is sufficient for every requirement. The Promontory mine is looking very well. George Lewis has out about eight tons of ore from the Custer mine, with plenty more in sight. The Pellegrini mine is a fine paying property. Frank Fitzgerald is having a large quantity of wood hauled for operations at Modoc. The Wild Rose will develop into a good property. Jack Gunn is also doing well in the Minnetta. Altogether, the outlook is exceptionally bright.

Kern.

OIL AND ASPHALT.—Los Angeles Farmer: Mr. Louis Blankehorn, the oil expert, who has been prominent in the oil business and supply company's management, has retired from that position, though retaining his interest in the association. He has associated himself with the Messrs. H. A. Blodgett and Solomon Jewett, banker of Bakersfield; he will manage and develop their extensive oil and asphalt interests, including the Standard Asphalt Company. Mr. Blankehorn is now erecting a refinery at Bakersfield, including large storage tanks, stills and other appliances for refining the heavy maltha or liquid asphalt, now produced from a number of wells near Bakersfield into a brilliant varnish asphaltum. The yield of these wells is fifty barrels per day, having a gravity of 90, Baume. The same firm is also engaged in developing lighter oils for fuel purposes. These industries have of late been quite a source of trade for local supply houses.

Nevada.

A GOOD HOUR'S WORK.—Grass Valley Telegraph, Feb. 23: Messrs. Hanly and Gross have been prospecting for a long time on Dead Man's Flat, and have frequently made some very good cleanups; but they excelled themselves the latter part of last week by taking out \$360 in gold in one hour. It is nothing unusual to strike "pockets" on the Flat, but this one was unusually good.

Mono.

THE BONIE CON.—Miner, Feb. 19: During the past week east crosscut No. 1, 700-foot level, was extended 10 feet. Upraise, 500-foot level, Jupiter shaft, was extended 7 feet. Are accumulating some ore from the stopes north of the above upraise. There were employed eight miners, one carman, and jointly with Mono, one engineer, one blacksmith, one laborer, one watchman and one foreman.

THE MONO.—During the past week upraise No. 2, 700-foot level, was extended 14 feet. North drift from No. 1 upraise, same level, was extended five feet. In this drift we are getting small seams of ore.

THE BULWER CON.—There was a lay-off of several men out of this mine a day or two ago, simply because of a plethora of ore in the stopes

and chutes. The ore body being very large and easily extracted, and the chutes all being full, made it necessary to lay off a part of the force. The ore in the face of the stopes continues to be of excellent quality.

SUMMIT.—Work progresses satisfactorily and the extraction of ore continues. A water pipe will soon be laid from this mine to the Lent shaft, and then steam instead of horse power will be used to run the plant.

Plumas.

PLACER.—Plumas National, Feb. 20: W. S. Dean, Nelson Fletcher and Geo. Engleback started to Geness Valley Tuesday to begin work on the John Peel placer mine, situated on Grizzly Creek. A four-horse wagon was loaded down with blankets, provisions, tools and snake medicine. They will be absent until the water season is over. A few days ago, Orr, Stephan, Edwards, et al. located 260 acres of mineral land at Shore's Hill. It embraces a great deal of an ancient river channel supposed to be rich in gold. During the past few weeks the owners have been prospecting the ground, and they say it would pay well from the surface down to the bedrock. Here is a chance for a big mine. Albert Keep and Fred Miller are reported to have a good prospect at Smith's Hill, below rich Bar.

THE CRESCENT.—Plumas National, Feb. 18: The work of rebuilding the hoisting works on this property, that were recently destroyed by fire, is being pushed with all possible speed. A temporary arrangement of pumps is keeping the water out of the mine while a complete new foundation is being put in. The pump-bob pit is walled with solid masonry, and the entire work is being done upon a most secure and substantial plan. The new building and gallow frame will be considerably larger than the old works. The teams of J. S. Hall and Tryon Kelley are hauling the heavy timbers, which are marvels in size and length. When finished the new hoisting works will be complete in every detail of equipment. Suot. Whitney is to be congratulated upon the energetic and thorough manner in which the damage done by the unfortunate accident is being repaired. Jo. Peppin came up from Granite Basin Saturday. He reports the mining outlook in that section to be good. Horace Waldron, who recently purchased the Homestead mine from A. G. Swan has ore that would pay \$80 per ton by a process of working by which the gold in the sulphurets could be saved. By the free milling process, however, the ore will pay largely. Mr. Peppin also speaks in very high terms of Pat. Maloy's mine, near Buck's ranch. He says it is a fine ledge. In his opinion it will pay at least \$10 per ton.

San Bernardino.

GRANITE AND MARBLE.—Los Angeles Express, Feb. 20: Theodore L'Honniedieu, of New York, and C. S. Whipple, of Indianapolis, have closed a deal for a red granite and marble quarry near San Bernardino. For a long time negotiations have been pending between these gentlemen and the parties who own the quarries, but the matter has been kept discretely silent. These people are going to New York to organize a stock company for the purpose of getting out red granite and variegated marble. They pronounce the red granite and marble to be superior to anything found in the quarries of the East. The marble is of beautiful color and highly susceptible to polish.

San Diego.

HELVETIA.—Julian Sentinel, Feb. 18: The Helvetia was started up again on Tuesday, after a week's idleness, eight-hour shifts being put on and work commenced upon a new level to be run west from a point 100 feet down the main shaft. This level will cut a large body of unexplored ground, and it is expected, will add largely to the present fine output of ore from the mine.

Shasta.

Geo.—Cor. Shasta Courier, Feb. 20: The new Reduction Works are to be located where the road from Andrews creek joins South Fork road. The contract for timbers for a building 40x100 feet has been let; also for several hundred cords of wood. Grading begins this week, and as many men will be employed as can work to advantage. Twenty tons a day will be the present capacity. The Crystal folks will supply 10 tons a day for some time. Other ore is in sight and promises, to keep things going for the present. At the Crystal they have been drifting north, thirty feet below the tunnel. Eighty or more sacks of shipping ore has come out thus far below the tunnel. Are now cross-cutting for the east ledge, within ten feet, likely. A 6-foot west ledge has just been struck in the main tunnel. W. D. Bull has shipped a little over two tons, netting about \$500. Eubanks & Co. had some ready to ship, but it was secured by the new Reduction Works. Robinson & Co.'s mines are reported bonded to a promoter of English companies. Mines are being relocated and new ones found in true "boom" style. The arrastres are running as usual. Alfred Ludwig found a large ledge of pay ore on the Ludwig place last week, near the Crystal. Fritz Groner has also found one not far off.

GLADSTONE.—The Gladstone M. Co. of French Gulch will soon have a sawmill in operation on Crystal creek to cut lumber mostly for its own use.

CROSS BOW.—Shasta Co. Democrat, Feb. 20: The Cross Bow Mining Co. has been reorganized, all the indebtedness of the old company liquidated, and the enterprise launched on a solid financial basis. The new company is now at work developing its property on a large scale, and proposes to develop the mine before putting up a milling plant. P. J. Bugbee of this city has a large block of stock in the concern. Last Monday, Lute Bahney showed us a sample of antimonial silver ore which also shows carbonates, which he brought in from a new location he made recently near the After-

thought mine. The ore also carries a fair per cent of lead and zinc. We are informed that the Bell Bros. purchased a claim in that vicinity, the ore from which carries as high as 60 per cent of lead. The Highland mill at French Gulch, owned by Mr. Lowden and Sheriff Hopping, deceased, will crush custom ore for prospectors this summer. Work on the Highland mine will not be resumed for some months. The Schroter Bros. are now putting up a cannon-ball mill on their mine near Shasta. The boys have some good rock to crush.

OLD DIGGINGS.—Cor. Redding Free Press, Feb. 20: There is nothing rushing in the mining line in this vicinity at present. The Texas is working an average force, enough to keep the 20 stamps going. Some six or eight men are employed at the Mammoth, three or four men at the Walker Bros' mine. All other mines and prospects are idle. Still money seems to be as plentiful now as it was at any time formerly in this district.

Sierra.

RUBY.—Mountain Messenger, Feb. 20: Thirty men are working at the Ruby, and the gravel is paying well. Three dividends, aggregating \$15,000, have recently been declared. David Noland, George Fries and Melvin Stewart are mining on the hillside below town, sluicing off the surface. The South Fork boys, at Forest City, think they are near a block of good paying gravel on the old Live Yankee ground. R. H. Judson was in town from the Ante Up ledge last Saturday and reported good running rock at his tunnel. We are informed that the Happy Hollow mine will soon be out of the hands of the Sheriff, about money enough having been realized to pay off the attachments. Wm. Hanley is extending his tunnel for gravel near Alleghany.

Siskiyou.

SCOTT RIVER.—Yreka Journal, Feb. 24: The Scott River Hydraulic Mining Co. intends starting work at its Scott River mine during the coming spring and summer on an extensive scale, the directors having levied assessments on the stock to raise a capital of \$40,000. When work is commenced, a large number of men will be employed and greatly assist in making times lively at Scott River, where there are several other valuable and rich paying mines, both placer and quartz.

WATER.—The rain and warm weather, lately, has caused the snow on the mountains to dissolve rapidly, furnishing a good supply of water for mining purposes. The hydraulic miners have started their giants, while the placer miners are doing considerable ground-sluicing with good success. The quartz mills run by water have also been started. In fact, there seems to be a grand mining boom, which will continue until late in the season, by reason of the great abundance of snow still remaining on the high mountains that will not disappear for several months under the influence of hot weather and warm rains. The old Warren quartz mill, moved from Yreka Flats to Long Gulch, is now being moved to Humbug creek, to be used in prospecting new discoveries in that section. An old former resident of this section in early days is also making preparations to put up a fine new mill on Humbug, which will make about half a dozen mills altogether on that creek.

Tuolumne.

COLUMBIA NOTES.—Cor. Union Democrat, Feb. 20: The Messrs. Grant, Bannister & Co., of the Columbia marble works, are about ready to commence work with their new machinery. They have been building new roads to different parts of their extensive quarry and are now able to fill all orders, however large. The Noonday mine has shut down temporarily, pending the arrival of new pumping and other machinery. They report a five foot vein in the bottom of the shaft. The ore increases in thickness as depth is attained. Messrs. Frank Boyd and S. Hummel have leased the Potter place near Springfield, and are making preparations for active mining operations in the near future. L. Dondero has his usual force at work on his claim at Yankee Hill. Good reports may soon be looked for from this extensive and valuable mine. Caleb Dorsey of Stanislaus county, passed through town last week on his way to his mine north of Columbia. It is said he contemplates the erection of a 10 stamp mill on the property in the spring. Messrs. Woodside and Butenthnath have at last succeeded in opening up their river claim on Otter Bar. The claim embraces quite an area of ground that can be easily worked, and it is said the prospects are highly flattering. Under the able management of Frank McKenna work is being actively prosecuted at Otto Kanig's mine on the Stanislaus river above Parrot's Ferry. The stamps are dropping day and night. Newcomer & Co. of American Camp are now at work on rich gravel, on which they will run uninterruptedly for the balance of the season. Supt. R. C. Davis is again at work in the Old Tuolumne mine.

NEVADA.

Washoe District.

CON. CAL. AND VIRGINIA.—Virginia Chronicle, Feb. 20: 1500 level.—The upraise started at the end of the crosscut run west 36 feet in from the south drift at a point 155 feet south from the shaft station, has been carried up 25 feet. From the same point in this upraise an east crosscut has been run 30 feet in porphyry and quartz of low assay value. From this upraise, at a point 43 feet up from the sill floor, a south drift has been started in a formation showing bunches of ore. 1650 level.—Have continued to extract ore of fair quality from the drift run west from the top of the upraise carried up 59 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from the winze No. 3 (down 73 feet) in working upward from that point. 1750 level.—In working out and upward from the bottom of winze No. 2, sunk

from the 1650 level, we continue to extract ore of fair quality. Have also extracted some milling ore at the point where the upraise carried up from the crosscut run west from the southwest drift made connection with the stopes on the eighth floor. 1800 level.—Along the south end of the drift running south from the crosscut run east from the winze No. 1, sunk from the 1750 level, we have continued to stope out ore from the sill floor upward of milling value. There has been extracted from all parts of the mine during the week 991 1760-2000 tons of ore, which was shipped to the Morgan mill. The average value of all of the ore worked at that mill during the week, 980 tons, was \$21.66 per ton. Bullion now on hand in our assay office, assay value, about \$13,000. Bullion shipped to Carson mint, assay value, \$25,173.74.

OPHIR.—1465 level.—The north drift started from the drift run west from the winze 122 feet below the sill floor of the 1300 level, 80 feet west from the winze, has been advanced 18 feet, in a porphyry and quartz formation, which yields a low assay value.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. west drift from the shaft has been extended during the week 22 feet; total distance west from the shaft 1682 feet. The face is in porphyry and streaks of quartz.

GOULD & CURRY.—200 level.—Work in east crosscut No. 4, which is advanced 139 feet, has been stopped. In main west drift 435 feet from shaft have started a northwest drift and extended same a distance of 20 feet through soft porphyry. West crosscut No. 3, 65 feet above this level, has been discontinued.

BEST & BELCHER.—900 level.—West crosscut No. 1, 100 feet north from top of upraise from 1000 level, has been advanced 10 feet, through soft porphyry and stringers of quartz; total length, 87 feet. Also did considerable repairing on this level during the week.

BULLION.—The south drift, 1500 level, is in 203 feet; face in porphyry. The joint crosscut on north line, 1400 level, has a total length of 184 feet; face in softer porphyry. The east crosscut, 1400 level, 100 feet from south line, is advanced a total length of 68 feet; face in porphyry.

NEW YORK.—The west drift from the shaft, 650 level, is out 431 feet; face in porphyry. The raise from No. 4 west crosscut, 650 level, is up 15 feet; top in quartz showing bunches of good ore.

ANDES.—North drift from east crosscut No. 4 on 420 level was advanced 23 feet; formation quartz and porphyry. West crosscut from north drift from east crosscut No. 4 was extended 12 feet; formation quartz.

ALPHA.—The west drift from the winze, 20 feet north of shaft, is out 175 feet; face in quartz and porphyry yielding low assays.

EXCHEQUER.—East crosscut, 150 feet south of north line, 600 level, is out 289 feet; face in porphyry.

WARD COMBINATION SHAFT.—The southwest drift, 1800 level, is out from the shaft 1130 feet; face in porphyry.

CHOLLAR.—The south drift from the Chollar and Norcross joint crosscut, 1640 level, is in 62 feet; face in porphyry mixed with quartz. Have started an east crosscut 50 feet south of joint west crosscut, which is in 29 feet; face in porphyry. East crosscut, 73 feet south of north line, 1500 level, is in 150 feet; face in porphyry.

POTOSI.—The Potosi and Bullion joint crosscut, 1500 level, is advanced a total length of 88 feet; face in hard porphyry. The Potosi and Bullion joint crosscut, 1400 level, is advanced a total length of 184 feet; face somewhat softer than it has been. Are putting in some timbers at the top of the raise from the 1230 to the 1130 level.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 500 feet; face in quartz and gypsum giving low assays.

SIERRA NEVADA.—The joint Sierra Nevada and Union west drift, 900 level, is out west of shaft 1682 feet; face in porphyry. The north drift is out a total distance of 612 feet; face in hard porphyry.

OCCIDENTAL.—The work in north drift from west crosscut from the south drift, 350 level, has been stopped for the present. The east crosscut from south drift, 750 level, is in 28 feet, and has reached the hanging wall. No ore of value was found in the crosscut. Have resumed driving the main south drift. The drift from the Sutro tunnel has been extended 29 feet; total length, 351 feet.

UTAH.—A new drift station, 25 feet in length, has been opened on the 340 level, and a west drift advanced therefrom 15 feet.

Tuscarora District.

DEL MONTE.—Second level.—West drift from North Commonwealth line extended 6 feet. West drift from No. 1 joint raise advanced 8 feet. Cave in No. 1 raise from west drift has been caught up, chutes put in place. Drift started west on ore, from top of raise, and stopping east to connect with line stopes. Line stopes produced 9 tons 1st-class ore, assay value \$261 per ton, and 24 cars 2d class, \$38 per ton. Third level.—No. 1 north drift advanced 18 feet, cutting seams of spar carrying some mineral. Will commence bauling 1st-class ore to sampling works Monday, 22d inst.

NEVADA QUEEN.—Second level.—No. 1 south drift advanced 35 feet in porphyry. No. 2 raise from same extended 12 feet to hanging wall, passing through vein of low-grade ore. Vein 16 feet wide at this point. South intermediate drift extended 15 feet. Fourth level.—West crosscut raise up 205 feet, progress made 23 feet; 35 feet more to reach south intermediate, which has 60 feet yet to be run. After this connection is made, will commence extracting ore, which cannot be done sooner for want of ventilation and chutes.

NORTH COMMONWEALTH.—Second level.—West drift has been extended 12 feet to Del Monte line, in vein matter. Stopes produced 4 tons 1st class, \$250 per ton, and 36 cars 2d-class ore,

\$35 per ton. A drift is being run from bottom of stopes to connect with 90-foot drift; good ore in both drifts, about 30 feet between the two.

NAVAGO.—South intermediate drift below the 350-foot level has been extended 6 feet, showing some good ore in the face.

Lovelock District.

BRIGHT MINING OUTLOOK.—*Cor. Silver State*, Feb. 20: The mining outlook for this district has never appeared better, and more prospects will be worked and more mines opened than ever before. The Arabia has been working steadily all winter and the body of ore has been steadily getting larger and richer, until now it can safely be placed among the dividend paying mines of the State. Mr. Stone, the gentleman who is at the head of the company owning the mine, arrived from the East last week and has gone to San Francisco, where the company owns a smelter. He expects to open up the mine this spring to sufficient extent to work 75 men, and will put in electric lights and drills. White Cloud, a mine recently bonded by Mr. Lovelock to L. V. Hitchcock of Erie, Pa., for \$75,000, will be opened about the 1st of March. A large new boiler has just arrived from the East for the hoisting works. A Mr. Martin of Detroit, Mich., is here. He is interested in the Trinity mine and has a number of men at work in that camp. They are putting up a Huntington crusher and will be running in a few weeks. Dr. Hutchins has a large force of men at work at his antimony mine, and the Bell nickel mine is still taking out large quantities of rich ore and must now have 1000 tons or more on the dump. When I say that the mining outlook is bright, I judge from the fact that at least 500 men will be employed in the mines tributary to Lovelock.

Monkey Wrench District.

RICH FINDS.—*Pioche Record*, Feb. 18: Encouraging news has just been received from this peculiarly styled location that shows the camp to be on the improve instead of the decline, as is so often the case with those extremely rich finds. Mr. Joe Cassidy was in town this week from that place, and not only brought with him the good news, but huge average samples of ore to be tested. The rock was of a free-milling character, and assayed in silver respectively 67, 132.40, 257.30 and 1974.50 ounces per ton. Quite a number of our citizens are becoming excited over the present outlook in that locality, and general appearance indicates there is apt to be a great rush to that section very soon.

Silver Peak District.

AN EXAMINATION.—*Walker Lake Bulletin*, Feb. 17: Mr. W. T. Charles is the authorized agent of the Messrs. Blair, the New York millionaires, who own the Silver Peak mines, in this county. He has made a very thorough examination of these mines, devoting several months to that purpose, and he informs us that they are the biggest thing he has seen on the Coast. The ore is gold, and of comparatively low grade, but there is a mountain of it, and it is practically inexhaustible. He predicts that, in the near future, work will begin on these mines on a large scale, and give employment to thousands of men. The present stagnant condition of things is owing to the indifference of the senior Blair—who is over 90 years old—and being very wealthy, does not care to enter the race for more money. His sons however, are eager to begin work.

ARIZONA.

MINERAL PRODUCT.—*Phoenix Gazette*, Feb. 20: The mountains surrounding this magnificent valley are impregnated with precious metals, much of which is not yielding to the indomitable efforts of the hardy miners, but as to the development of our mineral resources, our mountain ranges and vast deposits of ore bodies are almost undisturbed, and form one of the many attractive features of our county and offer a wide field for speculation. That these immense beds of ore will be long be utilized, is beyond question. In fact Arizona is a virgin field, but the passage of the Stewart bill, permitting aliens to hold and operate mining properties, will have a tendency to hasten operations in Arizona. Besides the production of precious metals, the output of copper from the Territory is steadily increasing, and to-day Arizona is third on the list as a copper-producing Territory, and within the next two years we will be second on the list of copper-producing States. And since copper has gone up in the markets of the world, many speculative individuals from across the sea have invaded Arizona with a view of purchasing undeveloped copper properties. We can say in all candor that the future of this country shines like a star, and with an undivided people intent upon the prosperity and development of this valley, nothing but the Omnipotent hand can prevent her rapid and easy march to success. Water, soil, climate, and a thrifty, united people form a happy and an irresistible combination of favorable circumstances which will make this valley one of the leading sections of this grand union.

GOLD BASIN MINES.—*Mohave Co. Miner*, Feb. 20: The mining claims owned by John P. Barnett and J. C. McKenzie will have a large amount of work done on them this spring and summer. The Senator has a tunnel 115 feet in, and it is expected, will tap the vein in about 10 feet. The ledge is about 45 feet in width. About five tons of ore from the croppings were run through an arastra and netted \$55 a ton in gold. These gentlemen have another location on the same vein, which they have named the President. The rock, in places, is immensely rich, while the ledge, as a whole, is good-grade, free-milling gold ore. As soon as the mine has been opened up sufficiently, a large reduction plant will be put up on the river near Scanlon's ferry. A narrow gauge railroad will connect the mine with the mill. One-half interest in an

adjoining claim, owned by Henry Schaefer, has just been sold to Colorado parties at a good figure, and considerable money placed on deposit for a working capital. Development work will be commenced immediately on the mine. There are four men at work on the Golden Rule. The ore is free gold and will be worked in the O. K. mill. The O. K. Co. will put a number of men to work on the Excelsior mine in a few days. Henry Schaefer has sold the Southern Pride, Golden Slipper and Josephine mines to the Good Hope M. Co. of Perris, San Diego county, California. The price paid for the property, we understand, was \$12,000. The properties are said to be among the best in the district. The new owners will immediately commence extensive development work on the property.

BRITISH COLUMBIA.

REVELSTOCK.—*Star*, Feb. 20: Messrs. John Stauber and Charles Matheson arrived at Revelstock last Saturday from the Lardeau country, where they have been mining for gold on the Lardeau creek ever since the latter part of last summer, with the exception of the last month or six weeks, during which they have put in their time hunting and trapping. They made from \$4 to \$5 a day per man for every day they worked, and have so much confidence in the future of that district that they intend returning there in a very short time. Mr. Stauber says the Lardeau is good enough for him, and that he has seen enough to satisfy him that there is a great amount of gold awaiting the miner's pick in that section. Only a very small portion of the country has been prospected, and there are indications which point to the Lardeau as being quite equal to Cariboo in its palmy days. After the heavy snowfall stopped work on their claims, they took to trapping, and were very successful in that line.

COLORADO.

NOTES.—*Idaho Springs Gazette*, Feb. 20: Peeler and Co. milled two tons of ore from the Ironton lode. John Hull shipped from the Henry Clay lode up Dry gulch. Jas. Young and Co. shipped a couple of tons from the Ward lode. John Easley had a mill-run from his lease on the West Alabro this week. Sam Bretbour shipped from the Gem extension to the Idaho sampling works this week. Chas. Bateholder shipped a load of ore from a prospect on the hill above the mouth of Chicago creek. L. A. Turner & Co. have taken hold of the 7-20 mine, and propose to develop it into a paying mine.

IDAHO.

THE FRENCH BOYS' GROUP.—*Wood River Times*, Feb. 15: The French boys' group of claims, on the Bullion divide, which was bonded a few weeks ago, for \$14,000, is likely to be bought and paid for within two weeks. The French boys' group consists of seven or eight claims, of which Louis Pelissier owns by far the largest interest, Auguste Thouvenot, who joined with Louis Pelissier in the bond, only owning in two of the least valuable claims. A. F. Montandon, who owns one-third of the claim in which ore was uncovered recently, has not bonded his interest.

SNAKE RIVER PLACERS.—*Idaho Falls Times*, Feb. 15: A gentleman was sent here last week to investigate matters. After a day's stay in Idaho Falls, he took his departure for points lower down the river. The gentlemen claimed, from what he knew of the bars in the bed of the river, with one-half decrease in the flow of the water in Snake river, a flow of 400 miles would be thronged with miners. It is well known that the various canals which are being taken out of Snake river will have a tendency to lower the water during the midsummer months, which will not only expose the rich bars, but furnish abundance of water for sluicing purposes. Since the canals have been taken out in this vicinity, there is already a perceptible difference in the volume of water at points from 100 to 150 miles below here to our certain knowledge. The high waters in the spring again supply the bars with gold, and we cannot see why mining on Snake river will not be a perpetual thing, giving employment during the summer months to thousands and thousands of men. Verily, it is a bonanza, and a few years only will prove the truthfulness of our assertions.

STODDARD.—*Silver City Enterprise*, Feb. 24: Sinking is still being continued on the west winze, in quartz. It is now down 95 feet.

TRADE DOLLAR.—*Tunnel No. 1*—Drifting north on the vein, which is three feet wide, with ten inches of \$200 ore on the footwall. *Tunnel No. 2*—Stopping is being done; vein is about three feet wide, with about ten inches of shipping ore. Crosscutting west to cut Jumbo ledge, which they expect to reach this month. *Tunnel No. 3*—Being driven north as fast as possible to cut the rich shoot of ore found in No. 2. The ledge in the present face is four feet wide of good milling ore; 3753 pounds of ore were sent to the railroad this week, making in all about 16,000 pounds of ore now stored in Falk's warehouse, of an average assay value of \$2500 per ton, which will be shipped in a few days, or as soon as the balance of the carload is sent from here.

BLAINE TUNNEL.—The tunnel which was originally 4x6 feet, and about 600 feet long, has been widened to 8x8 feet the full length, and is being driven ahead at the rate of eight feet per day. Double track has been laid the full distance, and the air plant is making the rock fly. Everything is running along splendidly.

LOWER CALIFORNIA.

THE MASAC CONCESSION FORFEITED.—*Lower Californian*, Feb. 12: Those persons who are interested in the progress and development of

Lower California will be glad to learn that the large mining territory situated near the town of Real del Castillo, in San Rafael Valley, which was ceded to Mr. T. Masac by the Mexican Government about four years ago, has been forfeited by the concessionaire and will be thrown open to the public. The territory, rich in silver and gold, which has been closed to prospectors and mining men all this time, is ten miles square. Numberless experienced miners have always believed it to be the richest territory in the northern district of Lower California, if not in the whole peninsula, and a large influx of prospectors into it can now be expected. It has long been known that the requirements of the concession on the part of Mr. Masac have not been fulfilled, and this fact has caused great dissatisfaction among not only miners who know of good properties in the territory which they were anxious to locate and develop, but farmers and others who had settled in the Real del Castillo and San Rafael, and who have witnessed the decline in business in their community as a result of Mr. Masac's failure to comply with his contract with the Government and develop the immense property. Now that the public will have a chance at it, we look for good times in the Real del Castillo and a better feeling among the people of the surrounding country.

THE BUTLER MINES TO BE WORKED.—*Lower Californian*, Feb. 5: The Butler group of mines in Alamo will be developed. This is good news to everybody in Alamo and Escondido, and upon the result of the development of these mines will, in the minds of a great many persons, rest the permanency of the camp. Mr. A. H. Butler, the owner, has been tireless in his efforts to interest capital in the properties, and he has at last met with success. Some weeks ago, Mr. E. A. Brennan, a mining expert, came to examine the mines in the interests of two well known San Francisco capitalists, and his report to them upon his return resulted in the organization of the Tomasa Hill Mining Company, whose object is to develop the Butler group of mines in Lower California. The mines are seven in number and are known as the Hattie, Gen. Torres, Reed, Dora Mettel, A. H. Butler, Arabella and ——. Mr. Butler retains an interest in them. It is expected that matters will be in such shape that work may be commenced in about three weeks. First-class machinery will be imported, and the first work to be done will be the sinking of a shaft on the Arabella to a depth of at least 500 feet. Mr. Brennan will superintend operations.

MONTANA.

AT BUTTE.—*Inter-Mountain*, Feb. 20: In the Butte mining field, in view of the extremely low price of silver, it is of some interest to the public to know that the great mines and mills of the camp are still running to their full capacity. How long they will continue to do so is problematical. Supt. Hall of the Alice Co. said yesterday that if silver kept hovering about the ragged edge of 90 cents, it was only a question of time when all the silver producers of the camp would be compelled to shut down. The Granite Mountain of this State, and the Ontario of Utah, he said, are the only great silver mines, of which he has any knowledge, that can long keep up production under existing conditions. With silver at \$1, the Alice properties will return handsome dividends; at 95 cents, a small margin of profit remains after paying working expenses; at 90 cents, Mr. Hall said, the Alice is worked at a loss. The Alice properties are located in one of the best silver-producing sections of the district, and their aggregate output up to date exceeds that of any other mining company in Butte. With their own mills to work their ore, with the best of mining machinery, and with the most careful and economical management, the Alice Co. should realize a profit if any company can. The effect of the low prices of silver is already apparent. During the week the Clear Grit was shut down, and all the men at the Black Rock were laid off, except eight or ten, and it is understood that they are to be laid off to-day. As far as could be learned, no new work of any moment has been begun on the hill. The great copper mines of the camp are all running in full blast, and in that direction new developments are being pushed with satisfactory results. Among recent enterprises, perhaps the one most worthy of note is the sinking of the Anderson shaft, near the Parrott schoolhouse. That shaft was begun on the 5th of October last, and is now down 200 feet. In sinking, a 15-foot vein of gold ore was cut. Two veins are known to exist in the company's claim, and a crosscut is now being driven from the bottom of the shaft to cut the north vein. It is thought the vein will be reached in a few more days. There is a great deal of ore stored on the dump, no shipments having yet been made. The capacity of the hoisting plant will shortly be increased by the addition of a new and more powerful engine than the one now in use.

OUTSIDE DISTRICTS.—From the outside camps of the State, very encouraging reports have been received. The Cumberland mine, in the Castle district, is being worked more successfully than ever before. The ore body is so large and its extraction so easy, that six men in the stopes readily supply the two smelters with ore. The largest output of the smelters for any one day was made a week ago yesterday, when two carloads of bullion were run out, and it was the result of about 90 tons of ore. On Monday last, the company paid \$75,000 on its indebtedness, and on Tuesday a controlling interest in the property was sold to J. K. Todd & Co. of New York. Work on other mines in the camps is being pushed with gratifying results, but owing to the want of smelting facilities and the long distance to a railroad, the ore taken out cannot be handled at a profit. Consequently, it is piled up on the dumps to await future developments. Some of the Neihart mines are panning out well, and, accord-

ing to the *Husbandman*, the Montana Gold, Silver, Platinum and Tellurium M. Co., last week, shipped a carload of ore taken from a drift, without sorting, that yielded \$135 per ton. At Barker are some of the best silver-lead properties in the State. Regular shipments of ore have been sent out from there since the completion of the branch railroad, most of it going to the Colorado reduction works.

NEW MEXICO.

AT CENTRAL.—*Southwest Sentinel*, Feb. 16: The recent strike of Bennett & Potter, at Central, is reported as having pinched out, but there is said to be a large body of high-grade ore in a claim adjoining that located by Bennett & Potter. The Bremen mill, operated by the Grant County M. & M. Co., is temporarily shut down, on account of the heavy roads, which have made it almost impossible to haul ore this month. Most of the ore which has been shipped from Cook's Peak has been shipped by wagon train to Florida station, but preparations are now being made to have the ore shipped to Crawford station from the mines on the west side. The Anson S. smelter, at Ansonio, is now in full blast, and M. W. Neff, who is largely interested in the mine and smelter there, expects to have \$10,000 worth of copper bullion ready for shipment in a few weeks. Morehead & Jasper, owners of the Maid of Monterey mine, at Pinos Altos, have 100 tons of ore out, which assays from 15 to 25 ounces in silver per ton, \$3 in gold, and carries considerable lead and copper. They will haul this ore to the Grant County M. & M. Co.'s mill here for concentration. R. P. Barnes brought in 29 ounces of gold and silver bullion, valued at \$8.80 per ounce, and 250 ounces worth \$1.57 per ounce, from the Steeple Rock M. Co.'s mill, last week. The mill has not been running steadily, or the amount of bullion brought in would have been much larger. Cook's Peak is now the leading lead-producing camp in the Territory, and there is every reason to believe that the production will be doubled this year. New strikes there are of frequent occurrence, and the development of the older mines in that district has shown that the ore bodies extend to a great depth. Five years ago, the production of this camp was insignificant, but now it must be ranked among the important camps of the Territory. Work will probably be resumed on the American mine, at Hachita, before long. The property was purchased, at the recent sale, by the owners of the Surprise mine, in the Cook's Peak district.

OREGON.

NEW LEADVILLE CAMP.—*Bedrock Democrat*, Feb. 20: The attention of practical mining men and capitalists is now, more than ever before, directed to the great mineral wealth of Eastern Oregon. Work already accomplished on the New Leadville mines, in Grant county, proves beyond the possibility of a doubt the immense wealth of that region. Major Downs, the superintendent of the Vultura, a mine in this group, reports developments in that mine of a most gratifying nature. The main shaft has attained a depth of 130 feet. Three hundred tons of ore, carrying 30 ounces of silver to the ton and 70 per cent of lead, is already on the dump, samples of which may be seen at the Statesman office. The necessary reducing works will soon be in operation, and when this is done, those vast stores of hidden wealth will go to swell the greatness of that State. Practical men have charge of these mines, and prominent capitalists are interested in their development.

GOOD RETURNS.—*Jacksonville Times*, Feb. 6: Dr. Braden's quartz mill at Gold Hill has been busily engaged for some time past, and with good returns to the owner, it is said. The present dry spell is discouraging to placer miners, as the supply of water has been exhausted in some places. A wet spring would help matters materially. If people discover placer mines in a stream, they are not at liberty to cut timber from adjacent public lands as they might do for quartz mining. This is a recent decision of Commissioner Carter of the General Land Office. Operations on the Comstock mine of Oregon (which is located in Willow Springs precinct) have been suspended for the present, owing to dissensions among the owners. A run was made on low-grade ore recently and proved satisfactory. The mine and mill have been closed by an attachment instituted by the employees of the company. A late Gold Hill dispatch says: On account of the scarcity of water, many of the miners have abandoned their placers, and are putting in their time prospecting for quartz. "Lucky" Bart's find on Sardine Creek is attracting great attention.

UTAH.

PARK CITY.—*Record*, Feb. 13: That the future of Park City as a rich mineral producer is assured for years to come is witnessed by the fact that the *Record* can again this week announce another new strike of good, clean shipping ore. Last summer Rosecamp and Glenn started a tunnel on the California claim, owned by themselves, M. S. Ascheim and Chris. Christensen. They drove the tunnel something over 100 feet up to last fall, and in doing so cut a number of streaks of low grade ore, varying in width from a few inches to several feet. These veins contained a large volume of water and caused the boys considerable trouble, but by close timbering and a good flume they were able to go ahead with developments, and continued the tunnel they were driving. Last week their labor was rewarded by cutting a nice vein of good clean ore and they are now in a fair way of securing a bank account. The ore is dense in grain, very black in color and heavy enough to run very high in both silver and lead, and though no assays have been obtained, good judges pronounce it fair ore.

SCIENTIFIC PROGRESS.

The Science of Physiognomy.

Can Character Be Read from Heads and Faces?

The study of character by observing the cast and expression of the human head and face is of great antiquity, and is known by the term "physiognomy." The claim of physiognomy to be considered a science, has been regarded differently by different persons for the last 2000 years. Some are enthusiastic in the affirmative, others as strong against it. Still, it has occupied the attention and study of the brightest men of every age, from the days of Hippocrates about 460 years before the Christian era down to the present time. Hippocrates wrote upon it as then being a subject upon which scholars had long been much divided. Socrates, who was his contemporary, was a full believer, and wrote the earliest systematic treatise upon the subject which has come down to us.

We have the record that Egyptian scholars, also, wrote largely upon the subject, and mostly in the affirmative. References to physiognomy are also found largely scattered through Greek and Roman classics. The literature upon the subject is very extensive, and of itself would form quite a library. The sixteenth century was quite rich in publications on physiognomy. Some 25 or more noted writers of that time wrote more or less fully upon the subject.

The writers of the following century generally attempted to bring discredit upon it, and more than 30 prominent writers and scientists of that time are recorded as entering upon such discussion mostly in the negative.

The first really elaborate attempt, in recent times, to elevate physiognomy to the rank of modern science was made by Lavator in 1775-8. The first real scientific school of physiognomy was founded by Sir Charles Bell in his "Essay on the Anatomy of Expression," published in 1806. A republication of Lavator's work soon followed, and gave an additional interest to the subject. "The correlation of the physical actions and psychical states" was made a subject of interesting speculation by Spencer in 1855, and those speculations were reduced to a system by Darwin in 1872.

We have been led to these reminiscences by a hasty perusal of two large volumes upon this subject, lately written by a well-known lady resident of this city—MRS. MARY OLMSTEAD STANTON, who has devoted a large portion of her life study to the subject of physiognomy. This lady had previously published several less pretentious volumes, but in the present work, consisting of over 1200 large octavo pages, under the title of

"A SYSTEM OF PRACTICAL AND SCIENTIFIC PHYSIOGNOMY; OR HOW TO READ FACES."

The author has given a most complete manual of instruction in the knowledge of human physiognomy and organism, embracing the discoveries of located signs of character in the body and face. The work is most profusely adorned by elegant and life-like engravings illustrative of the text, and printed on very heavy paper of the finest quality. It is dedicated "to the lovers of science—to the earnest and enthusiastic searchers for truth throughout the world."

These volumes display a most thorough knowledge of the subject, and constitute, really, the most complete formulation of this system of mental science which has hitherto been presented to the world. It is written in a plain, practical manner, such as would readily admit of its being introduced as a text book into our high schools and colleges.

No person can rise from even a cursory examination of the work without feeling that scientific and practical physiognomy should be introduced as a part of our common school education and advanced, by gradation, to our very highest institutions of learning. This study, commenced as it should be with its simplest principles, with the very beginning of our grammar grade of schools, could not fail to greatly advance the mental, moral and physical conditions of all humanity on which it might be brought to bear. Better, perhaps, than almost any other line of study, this study might be made to carry forward the evolution of the race to the very highest type of humanity. It is also well in line with an earnest and religious regard for the young, without the least touch of sectarianism. It is really a study of divinity in its highest manifestations of creative energy, and leads directly into the path best calculated to enable us to make the best possible use of the form and mental capacity with which humanity has been endowed.

The Philosophy of Electrical Action on Vegetable Growth.

TO THE EDITOR:—From recent experiments in France and other localities, so frequently alluded to of late in your columns, it has been demonstrated, beyond all doubt, that the application of the electric current to certain species of vegetation has the effect, in some mysterious manner, of accelerating their growth. The question therefore naturally arises, by what law are such effects produced upon vegetation. Is it true, as was formerly the general belief, that electricity is a fluid substance, contained by all material things, and that this fluid is composed of, or contains, the necessary fertilizing properties, sufficient to produce such effects upon the growth of vegetation? If such is the fact, then the application of electricity to the barren lands in certain sections of our country would have the effect to clothe them with vegetation and give value to the sterile and barren wastes upon our planet. But, owing to the advance in thought of the present century in relation to natural phenomena, the conclusion adopted by our more advanced scientists is that electricity is not a fluid substance, but that it is a force or a form of energy. If such is the case, and it does not contain within its composition those elements necessary for plant life, by what law then (would be naturally asked) does simple force or energy have the effect to stimulate the growth of vegetation?

In order to give a satisfactory answer to this question, it is first necessary to understand, or, at least, to have some idea of the process by which plants are caused to grow. Now, the phenomenon of the growth of all forms of organic life is due to a combination of the elementary atoms contained in the soil, and it is only when such atoms are in activity that their combination and crystallization into organic substance is possible, and that such combinations and the solidifying of the atoms is an effect of the interference of their motions. We arrive at this conclusion from an investigation of other phenomenon, as, for instance, in the phenomenon of light. It is demonstrated by experiment that an interference in the motions of the atoms which give to our minds the conception of light, have the effect to destroy the phenomenon and to produce darkness. So, also, in sound it is found that an interference in the sound waves has the effect to produce silence. For such reasons, we are justified in the conclusion that if the atoms which compose the various elements were at rest, the formation of substance would be impossible, but that it is in consequence of their continual activity and as an effect of their interference that solid substance is produced. The reasons why such effects are the result of an interference in the motion of the elementary atoms, the peculiar process by which such effects are produced, as well as the operation of the laws which regulate their motions, is, of course, beyond man's conception; yet we find that the law is uniform and constant in its operation, a fact of which the existence of the universe, with its endless variety of phenomenon, furnishes sufficient evidence. Under such circumstances, it is evident that any means that it would be possible to adopt, which would have the effect to accelerate the motions of the elementary atoms contained in the soil, would, from the nature of things, accelerate the growth of vegetation upon its surface, since the interference in their motions and consequently their combination, would proceed at a more rapid rate, and their crystallization into plant life would be accelerated in a corresponding ratio. It is for such reasons that vegetation under glass, as well as steam pipes buried beneath the soil, have the effect to put into greater activity the elementary atoms of the soil, by a contact of atoms and to accelerate the growth of plants.

For such reasons as given, we are justified in the belief that this mysterious phenomenon known as electricity is simply the motion of atoms of some one of the elements, varying, of course, according to circumstances, or of the conditions under which such motions are produced; for instance, there are reasons for believing that the lightning flash is an effect of the intense motion of the atoms of oxygen gas which has accumulated in excess in the atmosphere above, set free from the surface of the waters of our planet by evaporation, while it is possible that the phenomenon of plant growth may be accelerated by stimulating the motion of the atoms of carbonic acid gas within the soil by imparted motion, produced in the battery by the decomposition of metallic substances; and in my opinion, it is this motion imparted by contact to the elementary atoms of the soil, by the intense motion of atoms of certain elements from without, which is termed the electric cur-

rent, that explains the mystery of the increase in the growth of vegetation, as an effect of its application.

The evidences presented by the fossil remains of various forms of organic life, found beneath the earth's surface, show us that in prehistoric ages all forms of life were of a gigantic growth, compared with the present; hence the question would naturally be asked, why are all forms of life gradually decreasing in dimensions? Is it because the elements of which they are composed are being continually lost or destroyed? No; but since experiment has demonstrated the fact that in order to increase in dimensions the growth of vegetation it is necessary to stimulate the atoms of the elements which compose them into greater activity, it is therefore evident that the gigantic growth of organic life in the past, was owing to the greater activity of the elementary atoms. But why their motions should gradually decrease, or by the operation of what law such effects are produced, or for what special purpose, is, of course, beyond man's conception. At any rate, judging from the present growth of all forms of organic life, compared with their dimensions in the past, it is evident that the elementary atoms are tending to a passive state, for which reason we must assume that a state of rest is the normal condition of the elementary atoms of which the universe and all things are composed. It is therefore only a question of time when the universe, with its myriads of celestial bodies, will become, like our own satellite, a cold, lifeless collection of dark masses, having fulfilled their destiny, as designed by the Creator and Ruler of all things, have now become a collection of cold, lifeless and dark objects, like old abandoned hulks upon the ocean, floating at random in space.

C. W. HASKINS.

MECHANICAL PROGRESS.

Old Versus Young Mechanics.

The strict rules of trades unions in keeping down the number of apprentices which may be allowed to any given shop is working great injury in many ways. In the first place, while closing tightly the doors against their own sons, and young men generally, they are opening them all the wider for those who come to us from abroad fully prepared to enter our shops as journeymen workers. Our own young men are thus boycotted in favor of new comers from abroad, and many of them are necessarily compelled to grow up in idleness, with no trade and nothing but unskilled labor to lean upon when the burden of life and family responsibilities come upon them. The result is disastrous not only to themselves and families, but to the community at large as well.

But this is not the only evil which arises from such unwise action. Antipathy is not too severe a term to express the feeling that has gradually grown up in many, if not most, shops where old and young mechanics are brought together—a feeling which is even more intensified against apprentices. It requires no very close observation to detect this feeling or the ill-effects to both the individual and general welfare of the shops where such antipathy exists. Would it not be better that some way should be devised to remove this troublesome condition? A little thought and honest reason ought to convince, at least the men with families, whether natives or not, that it would be better to call a halt and adopt rules which would fill the shops with their own sons, benefit our own people, and give to the apprentice and young mechanic a better feeling and a more manly bearing than can possibly be expected under the present condition of things. A writer in the *Scientific Mechanic*, in alluding to this matter, says:

"The young man, in serving his time and long after, meets with many disadvantages in the way of not having done, or not having seen done, the work he is now asked to do. With his limited experience, he naturally goes at it in an awkward manner, and right here is where the older and more experienced hand has the opportunity of showing that charitable feeling that should characterize and control the human race, by approaching him and offering his assistance, and not allow this feeling of superiority and opposition to influence his action.

"And, again, care and judgment should be exercised in approaching the inexperienced shopmate so as to cause no offense, and I feel quite sure when he realizes how you so ably assisted him, he will always, in the future, appreciate the kindness and respect you have shown him, and at some time later on perhaps it will be profitable and convenient to exchange ideas with this young man. For this reason, and

many more, this feeling should not exist, and if the elder mechanic of to-day would take this view of the matter, there would be no such feeling. On the other hand, it is not impossible for the young man to have in him the making of a better mechanic than any of his associates, and, therefore, need no assistance. In this case, he will in all probability be given the choice of particular work of the shop. It is then very easy to detect this stored enmity, and it comes forth in such expressions as 'He's a pet of the boss,' or 'He has rich relatives, which gives him preference,' etc. And I say to those who use such language, you show not only your malice, but ignorance also, and destroy any good quality you might have in other directions. It is much more becoming the older mechanic to encourage the young man, and accept the situation philosophically."

A GOOD STUMP PULLER—one that could be worked simply and at little expense, that could be sold at a reasonably low figure, would be a great desideratum for the farmer in wooded districts—such a machine seems to have found its way to Oakland, and is described as follows: The machine was put to a small stump about three feet in girth, and it was taken out in one minute and a half. The machine was then put to a large stump measuring ten feet in girth, and it also yielded to the enormous power in ten minutes. The machine is hydraulic, with eccentric wheels, and is easy to move from stump to stump. The water power is a few gallons of water that is used over and over again. The inventor claims that with it two men can uproot stumps and trees up to 16 feet in girth in from two to ten minutes each. The company is formed into a stock company, and they intend giving trials in all the leading towns.

NEW SOAP FOR METAL WORK.—The soaps used for cleaning metal work usually consists of mixtures of vaseline, oleic acid and fat, mixed with a small quantity of rouge. When freshly prepared they leave nothing to be desired; but, unfortunately, such mixtures soon turn rancid and become unfit for use. A new soap for metal work, which is stated to be free from this objection, is made from cocoanut butter in the following way: 2.5 kilos. of the butter is melted in an iron vessel, together with a little water, and to the mixture is added, with constant stirring, 180 grms. of chalk, 87.5 grms. of alum, 87.5 grms. of cream of tartar, and 87.5 grms. of white lead. This mixture is then poured into molds and allowed to solidify. The soap so obtained is made into a paste with water and rubbed over the metal to be cleaned, and finally removed by a dry rag or chamois leather.

EDISON'S PATENTS do not seem to have thus far brought him much direct wealth. In a recent interview he is reported to have said: "From my various patents, so far as the patents themselves go, I have stood an actual loss in experimenting and in lawsuits of \$600,000. I should be better off if I had not taken out any patents. I do not mean to say that I am a pauper, as you might think from my talk, but my money has not been made out of patents or out of any protection that the Patent Office has given me. I have made it all in manufacturing, and I have made quite enough to pay for my experiments and to get a good living, which is all that I care about. I have worked on as many as 40 machines at one time. An exhibition of all the machines that I have worked at and experimented on, if I had kept them, would cover about 25 acres."

THE BATTLE BETWEEN PROJECTILES AND ARMOR PLATES.—The late successful tests between American and English and French armor plates at Annapolis, in which American superiority was shown, seems to have aroused the energies of our English cousins to once more take the lead. An English paper states that some very exhaustive armor plate trials have of late been conducted at Portsmouth, which have demonstrated that there is a British process that produces plates equal, if not superior, to any that have been experimented with in America. The process gives results such as have been sought to be attained by the Harveyization of the best highly carbonized nickel steel. If this is so, it is now our turn to reach out once more for a new step in this direction.

A NEW PAVING MATERIAL now being introduced in London is composed of granulated cork and bitumen, pressed into blocks, which are laid as brick or wood pavements. A pavement of this material is very elastic and pleasant to the feet, and affords an excellent foothold for horses. There is almost an entire absence of noise.

ENGINEERING NOTES.

Canals and Deep Water Ways.

A large amount of interest seems to be engaged, just at this time, in opening up water ways for transportation in various parts of the country. In our own State, much interest is felt in the proposed canal through the San Joaquin valley; and no wonder, when the railroad charges are as much for haulage from Visalia to San Francisco as for the same amount of transportation from Visalia to St. Louis.

Careful estimates show that a good and continuous water way can be opened from navigable water on the San Joaquin to Buena Vista lake, a distance of about 220 miles, for about \$1,205,000, an average of about \$5,500 per mile; thus opening to the cheapest kind of transportation one of the grandest and most productive valleys in the world; and one capable of supporting about as large a population as is now found on the entire Pacific Coast.

With such a canal, and a proper location of feeders in the shape of cheap electric roads along both sides of the canal, there is no estimating the amount of products which might be marketed, or the wealth of land which might be thereby created. That such a work will soon be accomplished there can be no doubt, and it should be constructed as far as possible, by persons having interests in that valley which call for cheap transportation. Such a work should never be allowed to fall into the hands of outside owners whose charges might be "all that the traffic will bear." This subject will soon be before Congress. The Secretary of War has already transmitted Major Heuer's report on the practicability and need of the improvement.

Another important California improvement is the projected canal from the head of San Francisco bay to San Jose, so as to connect that growing city directly with all the great water ways of the State.

DEEP WATER WAYS AT THE EAST.

The combinations of railway facilities is everywhere driving the people to protect themselves by going back to the old time systems of transportation by canals. There is a determination to secure cheaper transportation between the Great Lakes, into the vast country bordering upon Ohio, by a deep water ship canal through the center of that State to the Ohio river. Preliminary surveys have been made and there is no doubt but that a practicable and easy deep water way can be found.

Energetic measures are also being taken to secure a first-class ship canal—sufficient for war ships from New York inland to Philadelphia, connecting the Delaware and Chesapeake Bays. Such a canal will be but the beginning of a grand inland water way throughout the entire distance of the Atlantic coast to the Gulf of Mexico, and possibly through the upper portions of Georgia, Alabama and even to the Mississippi river, some two or three hundred miles above New Orleans. Such thoughts are even now in the minds of enterprising, progressive capitalists and engineers.

Such a work may appear chimerical, just now, but there is no computing its value both in peace and war. When this nation again doubles its population, which it will do during the lives of many who are now in the meridian of life, and we number over 120,000,000 of people, no useful project will be too great or too costly to be accomplished.

Our lake shore traffic has already reached a magnitude which no one could hardly have dreamed of 50 years ago, and it is growing with a rapidity absolutely startling. What it will be by the middle of another century no man can tell—no man will venture to compute. The eyes of the entire nation are now turned in that direction and estimates and calculations are being made for improvements which are greatly needed, and which will soon become indispensable. Our neighbors on the other side are outstripping us in this direction, with possibly a more special eye to the probabilities of some future international conflict as well as to the needs of commerce.

A 21-foot channel around all obstructions to natural navigation, is what is needed and demanded from Lake Superior to the Atlantic, by those who are urging active measures in this direction. Canada, with her three millions of people, has already spent \$60,000,000 in perfecting a deep water way on her side; while this country with its sixty millions has spent less than half that sum.

Even with that small expenditure the saving in transportation during the last year only, is said to have been \$150,000,000 more than the total cost of those improvements. It is claimed that only \$3,000,000 more of expenditure would give us 20

feet of water. Congress will be urged at its present session to grant that sum. Who would oppose it? Even if destiny should so order that our neighbors and ourselves should become one and the same country, the improvements on both sides will be an urgent necessity for commercial purposes alone, within a very few years.

At the recent Deep Water Way Convention held in Detroit, it was stated by one of the speakers that when Canada has completed her improvements now under way, unless corresponding improvements are made on this side, "the United States could no more compete with Canada than a wheelbarrow could with a freight train." Our shipping interests on the Lakes, large as they now are, would be vastly increased if our lake vessels could only get to the ocean and engage in ocean business during the five months of the year in which navigation is practically closed in those high northern regions.

The improvement of the Lakes also implies an early deepening and widening of the Erie canal to a deep water ship way. That work would also be as much needed under a political union of the two countries as now.

GOOD HEALTH.

Health of the State.

The report of the State Board of Health for January, gives the mortality returns from 118 cities, towns and villages, having an aggregate population of 819,913. The deaths reported from all causes were 1622, at the rate of 23.64 per thousand per annum. Consumption caused 223 deaths; pneumonia, 285; la grippe, 96; bronchitis, 75; cancer is credited with 44—making that malady the fifth in point of fatalities on the list. Various complaints of the stomach and bowels caused 53 deaths; various throat diseases, 72, and diseases of the heart, 110. There were 595 deaths from various diseases of the lungs in January, as against 706 in December. There was also a falling off of 16 in diphtheria; 9 in typhoid fever; but an increase of 49 from la grippe.

The State at this time is free from small pox, outside of the Government quarantine station on Angel Island. There, however, the disease seems to have taken a permanent hold among the 500 Chinamen recently landed from a China steamer. The large number of cases which have been developing from time to time since the landing, tells in a most unmistakable manner of the terrible scourge with which the State would have been visited had not the Health Board and other proper authorities taken the most thorough precaution to confine the disease among those who are responsible for bringing it here. It is to be hoped the authorities will not relax their precautionary action until the malady is effectually stamped out on the island.

MEETING OF THE CITY BOARD OF HEALTH.

A very lively and interesting meeting of the city Board of Health was held on the 17th instant, at which the subject of small pox and general hospital matters were freely and somewhat forcibly discussed. The Board manifested a most firm determination to do its duty in all matters pertaining to the small pox invasion.

The general subject of the need of further and better hospital accommodation was freely discussed. The importance of more and special accommodations for incurables and cancer patients was referred to. Dr. Regensberger thought it would be wise and proper to call on the Legislature for an especial appropriation for such purpose, as San Francisco was simply a resort for such people from all parts of the State, and necessarily so from the fact that there was no other place for them to go to. It is to be hoped that this matter will not be dropped, but that it will be called up at the next meeting and more fully ventilated.

The Shag Rock business was freely ventilated, and found but one supporter, while all the other members of the Board present were free and generally very emphatic in their denunciations of the project.

The meeting closed with a very pretty and appropriate episode, which consisted in the reading of an interesting and well written paper by Mrs. Ellen A. Weaver, Matron of the Almshouse, and wife of Mr. P. L. Weaver, Superintendent of the same. Mrs. Weaver drew a very beautiful and vivid picture of life in that institution, and described in a striking manner the marked contrast between the characters of those who are obliged to seek that resort from unavoidable misfortune and those who find their way there as a consequence of their own misconduct and downfall. The paper was written for and read before the Century Club, of

which Mrs. W. has long been a prominent member, and by special request was repeated before the Board of Health. The address furnished the most striking evidence that the Matron, who is a well educated and polished lady, is the right person in the right place. She received a most hearty vote of thanks for her effort.

ELECTRICITY.

The Advance in Electric Railroad.

The progress which electric railroading appears to be making is simply amazing. Only three years ago, the number of such railroads in operation in the United States was only thirteen. It is claimed that the present number exceeds 400, with fully 100 more either in course of actual construction or in early contemplation! Only about 70 cable roads are in operation and in course of construction; while horse car roads are disappearing as fast as the work of reconstruction can be carried on. The electric railroad, both street and long distance, has come to stay, and is moving onward with all the exhaustless power of the ocean's swell. It has fully passed its experimental stage, and even with our present limited knowledge of its possibilities, it is better, cleaner and far cheaper than steam. Judging from the past and with our actual knowledge of the present, nothing is more certain than that the early future of electric railroading will show most wonderful progress. We append a few indications of the current progress in this direction:

A commission of railroad experts has recently been investigating, at Pittsburgh, the subject of electrical transportation as applied to railroads. The commission represented the Northern Pacific, Wisconsin Central, and other roads. The members visited the Edison works, the Thompson-Houston at Lynn, Mass., and then spent two days at the Westinghouse works. The partial result of their labor, and the intention of the railroads they represent, was reported by Chief Engineer McHenry, of the Northern Pacific Company, as follows: "I believe that the motive power will be applied directly to the axles of each car, thus making each car its own motor. Experiments are to be proceeded with at once; they will take place at the various works and much of the cost will be borne by the railroads. I don't see why electricity should not displace locomotives, and especially over steep grades. The question which will be most difficult of disposition will be the transmission of the current and the obtaining of adequate conductivity in the wires."

The expensive work now going on in Broadway, New York, of building a cable road through that thoroughfare, is alluded to as follows by a technical journal of that city:

"The meeting of the New York State Street Railway Association last week was almost wholly devoted to electricity, and that with the more significance that just outside of its hall were the new tracks of the Broadway cable road—one of the wildest pieces of folly that this generation of New Yorkers has seen. Splendidly built as the road is, one can but see in it the evidence of poor judgment and expensive short-sightedness. It is as though a man had invested heavily in fine stage coaches at the moment when steam locomotion had begun to make its triumphant demonstration. The paper by the incoming president, Mr. Beckley of Rochester, was enough to show which way the tide was running, for admitting all the defects of the electrical method, he was still compelled to advocate it as that which, par excellence, is the best for nearly every large community in the United States. The proof of the pudding is in the eating. Three years ago, there were a dozen operative electric roads in this country. To-day there are 375, with another hundred getting ready for work."

The subject of fast electric trains is becoming more and more a matter of general interest among railroad men throughout the country. A late issue of the *Chicago Journal of Commerce* states that:

"A company has just been incorporated in Springfield, Ill., for the purpose of building an electric road from St. Louis to Chicago. Among those interested are Gov. Fraoicis, Congressman S. W. Cobb, John W. Harrison, I. G. W. Steadman, Web M. Samuel, E. S. Rowe, William H. Thompson, Pres. of the Bank of Commerce, Dr. Wellington Adams, the inventor of the first successful electric motor, and John P. Kaiser. They represent several million dollars. The company proposes to build a double track road, as straight as an arrow, without a curve to it. On this road it is proposed to run electric cars, which will travel at the rate of 100

miles an hour, making the distance in 2½ hours instead of eight as now. The power station will be at Clinton, Ill., where the company will operate its own coal mine for fuel, using electric drills for mining machinery.

In time, the entire line is expected to become a boulevard, the farmers' houses standing on city lots, while behind them will stretch the wheat fields. The houses will be heated and lighted by electricity, and the reapers, mowers and thrashers will be driven by chained lightning. An electric block system will be operated, and the track will be automatically illuminated a mile ahead and a mile behind each car. Trains which are on the same section will have telephone connection, and communication may be had whether the trains are moving or standing still."

More Experiments in Electroculture.

It is reported in a French journal that further experiments in electroculture have been carried out near Garonne, by M. Barat. The growths experimented upon were potatoes, tomatoes and hemp. A row of hemp, subjected to the influence of the electric current, produced a row of stalks 18 inches higher than those not electrified, in the same time. Two pounds of potatoes planted in the path of the current, produced a fraction over 40 pounds of very large and healthy tubers, while the unelectrified patches only gave about 25 pounds of medium size. The electrified tomatoes also became ripe some eight days before the others.

A curious and important fact has been remarked by M. Barat in his experiments. If a quantity of manure is near the positive pole, the constituent parts of this manure are transported toward the negative pole, and their effects make themselves felt around a distance of some yards. This would seem to be a fresh proof of the opinion long advanced upon the part played by electricity in the growth of plants, an opinion also adopted by M. Specnew, who has given some attention to these phenomena; this is, that the action of the electric current upon plants seems to consist in the more active dissolution of the organic principles existing in the soil which are thus brought within the reach of the roots.

The leading article on the adjoining page of the present issue, entitled "The Philosophy of Electricity on Vegetable Growth," will be read with interest in connection with the above item and many others of similar import which have been published in these columns during the past few months.

A NEW DANGER.—Powerful dynamos are often placed near each other. The following item shows that it is not safe to pass between them when so placed. It is a new and unexpected danger, but one which may be easily guarded against. The item reads as follows: "While F. W. Martin, an electrician at Toronto, Canada, was passing between two large dynamos in action, he was suddenly rendered unconscious—shocked by induction. When he recovered consciousness it was found that he was blind. At last accounts, his final recovery was considered doubtful." In connection with the above, the following item from the *Saginaw News*, will be interesting as explaining why a line-man recently escaped with his life after making contact with a live arc light wire. The *News* says: "Fortunately the wire was a small one, and he had taken a firm hold of it; otherwise, as the dynamo at the works was running 2000 voltage power, he would have been instantly killed. A slight contact, it appears, is much more dangerous."

CUTTING ICE BY A HOT WIRE.—Electricity is to be brought to bear in reducing the labor of cutting ice—it is to do away with plows and saws. A wire will be stretched along the ice and kept redhot by a battery. Thus heated, it will sink into and cut the ice very rapidly, and much cheaper than by the present method. The idea is as yet only a suggestion, but appears to be perfectly practicable. In these days in which electricity is harnessed to all sorts of work, there appears to be no reason why it should not be employed as above.

ELECTRICAL BLASTING.—Electricity has been tried in Sweden for blasting. A deep hole is drilled in the rock and a Jablochhoff candle is inserted and the current turned on. The intense heat causes the rock to swell at all points, and internal strains crack the whole rock. Holes are best drilled into the solid parts, not, as in blasting, in the seams and soft places. Such a mode of blasting would avoid the dangerous use of powder and other more violent explosives when employed in near proximity to dwellings, as is often done in this city, with dangerous and sometimes fatal results.



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W. B. EWER.....SENIOR EDITOR

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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Electric Machinery—Electric Improvement Co. The Colliery Engineer School of Mines, Scranton, Pa. Corliss Engine for Sale—310 Pine St. Situation Wanted—Assayer. Removal Notice—Blue Lakes Water Co. ☞ See Advertising Columns.

Passing Events.

The memorial adopted by the State Miners' Convention has been presented to Congress and referred to the Committee on Commerce, which will give a hearing to the committees from this State very shortly.

Camminetti's joint resolution, directing the War Department to proceed with the work begun by the commission of engineers, has passed both houses and gone to the President for signature. This is a great step in advance and shows that something will be done this session to help the mining industry.

A miners' association was organized in this city on Tuesday, to represent the San Francisco county branch of the California Miners' Association. It is expected that a large membership will be obtained, since there are many persons in this city with investments in the mines of California.

THE two shafts of the St. John del Rey mine, Brazil, have been sunk on contract by hand-labor. The men were paid extra wages and were sent from England to sink these shafts, which they are doing at a very rapid rate. To quote from a recent report in an English paper, "Boring machines are not so good for sinking as for driving, and these men, in sinking, have knocked air-compressors into a cocked hat."

SHASTA COUNTY miners will organize a county miners' association on March 1st.

Where Gold Predominates.

A Colorado mining paper, in speaking of some recent important mining strikes, says: "One of the better features of these numerous strikes lies in the promised material increase of the output of gold. This metal seems to predominate at Cripple Creek, and also in the Boulder discoveries. In view of the low price of silver, which appears to be steadily declining, each new revelation of gold-bearing ground will be hailed with rejoicing."

In this respect, California has the advantage of the other mining States and Territories, its principal mines being gold-producing. It can scarcely be said, however, that this advantage is especially appreciated by the general public of the State outside of those directly interested, since capital to open and develop the gold mines has to be sought beyond our borders. The miners themselves have received very little encouragement from our own people of late years. One very important branch of the gold-mining industry has been prohibited from working for the last decade, and it was only hard experience which at last brought public attention to the great and direct loss entailed and the benefits which would accrue should these mines be rehabilitated.

Notwithstanding the fact that the \$10,000,000 per annum from these mines has been cut off, California still heads the list of gold-producing States of the Union, a position it has continually held for forty-two years. But there should be hundreds, if not thousands, of producing mines instead of the comparatively few we have, and there certainly would be if capitalists at home and abroad were suitably advised, or would visit our gold-mining regions and see for themselves.

In the other States, where silver predominates, they have been compelled to see their product become a political factor. They have to look up the quotation daily to see what it is worth, and must stand a greater or less discount,—but always a discount. Therefore they congratulate themselves and "hail with rejoicing each new revelation of gold-bearing ground."

Here in California gold may be found in a mountainous belt some 700 miles long, from San Diego to Siskiyou, with water, timber and a favorable climate to work in.

For the product of a gold mine there is always a prompt cash market. It never suffers by competition. There is no doubt about its ready sale. Trusts nor combinations do not affect it, and freight rates or distance have no disturbing influence. It is the basis of value; the standard for all other products; and the one thing for which everything else is produced and bartered. No legislation is needed for the metal; all countries receive it on an equality, and all men strive for it.

The mining for gold is a healthful, manly occupation, incapable of being overdone or excessively crowded. With a hundred times as many mines as we have, the products would not lessen in value nor would there be competition between the producers. There are quartz mines, hydraulic mines, drift mines, bar mines, river mines, beach mines, river bed mines, gulch mines—all producing gold, all being worked in different ways for the same product. Where rightly undertaken and prudently carried on, this work is attended with as little uncertainty as most other callings. There are of course blanks as well as prizes; but so there are in all industries. But the era of speculation having passed by, and that of legitimate business in this industry having been established, it is now conducted in this State on the same basis that exists in other enterprises.

THE Calico Mining Company has commenced three suits in the U. S. Circuit Court against the Waterloo Mining Co. of Calico, San Bernardino county,

Drift Mines and the Law.

There are in California many lava-capped "divides" or ridges covering the ancient river channels filled with auriferous gravel, which channels are mined by the drifting process, necessitating long and expensive tunnels before the gold-bearing channels can be reached.

This lava-cap is often a thousand or more feet over the auriferous deposits, and it is impossible to reach the gold without great expenditure of time and money.

The miners naturally do not desire to expend time and money on land to which they have no title; yet the Interior Department has decided that "the presumption that the gold-bearing channel extends under these hills, or that it contains gold in appreciable quantities will not answer and the miner must show the actual existence of gold," even before the end of the tunnel reaches the deposit.

That official rulings of this character continue to prevail, show as they do an entire ignorance of this branch of gold mining, absolutely prevent the obtaining of proper title to such mineral lands, and deter labor and capital from opening and developing or working this important field of gold mining.

The mining laws of the United States should be so changed as to recognize the peculiar features of drift mining, in order that patent can be obtained when work is commenced to open such auriferous deposits. The presumption being that the miner will not run tunnels to reach the buried gold unless his experience induces him to believe he will find it.

The miners all condemn the rulings and practice of the Department, which compels the miner to prove the existence of gold in paying quantities before he reaches the deposit containing the gold, and our legislators in Washington should call the attention of the Committee on Mines and Mining to the subject.

For the Miners' Cause.

Some of our cotemporaries are still criticizing the San Francisco Board of Supervisors because they gave \$1000 to the miners and then took it back. The fact is their intention was good, but the opinion of their attorney was that they could not legally give the money, so they had to rescind the original resolution. Nevertheless they gave their moral support, by passing a series of resolutions, which were officially forwarded to Congress.

Although the county, as a county, could give nothing, the citizens have subscribed several thousand dollars to the cause, and some thousands more are to come. San Francisco has done very well in this respect, as will be shown when the figures are published. The local county association, just formed, will soon give also a good account of itself.

The county which, next to San Francisco, has given the most is that of Nevada. The Supervisors gave \$1000, and the Nevada County Miners' Association \$1000 more. Several counties are yet to be heard from in this matter of collections.

THE MECHANICS' INSTITUTE.—At the annual election on Tuesday the candidates on the regular ticket were: A. S. Hallidie, D. A. Macdonald, A. W. Stott, George Cumming, Marsdon Manson, Charles A. Malm, Ferdinand Formhals. Those on the opposition were: Irwin C. Stump, Robert Ewing, W. T. Y. Schenck, J. K. Firth, Charles Elliott, R. P. Hammond Jr., Henry T. Bush. At a late hour Judges Culver, Royher and Gilmore announced the following result: Votes cast 1569, regular ticket 793, straight 612, scratched 181; opposition ticket 776, straight 503, scratched 273. When the ballots were all counted it was ascertained that all but two on the regular ticket had been elected. Of those on the

regular ticket Hallidie received 942 votes, Macdonald 842, Stott 799, Cumming 845, Manson 845. Of the opposition Stump received 772 and Firth 793. The two on the regular ticket who were defeated were Malm and Formhals.

The New Excitement.

The Creede camp is causing an old-time excitement in Colorado. Numbers of discoveries are being made, and hundreds of men are going in hoping to make the strike they have always been looking for. So far much of the work has been done in country rock from a surface barren of indications and covered with two feet of snow. Now and then some one makes a lucky hit in a blind way and this is sufficient to convince each one that his time will come. There is talk of sinking deep holes and of diamond drills to prospect the contacts and the suspected blanket formations, but so far 10-foot holes have been the limit of depth in these locations. The big producers are sending out the usual quantities of ore, averaging about 20 cars a day.

In the camp the boom goes on and gets bigger and apparently on more solid ground every day. Merchants are having enormous trade in all lines. Lodging houses and restaurants are no sooner opened up than they are crowded with patrons. Lumber companies cannot get lumber fast enough, and although nearly a dozen are in the field and getting immense quantities every day, they are unable to half supply the demand.

The railroad company finds it impossible to do the business. They are bringing in from 40 to 50 carloads of freight a day, but every sidetrack between Creede and Alamosa is full of cars loaded for Creede. The lack of sidetrack and other inability of the train and station crews to handle the immense quantity that the camp demands is felt in all lines of trade. The camp is out of coal, coal oil and some other staples, and the local merchants all have big bills held back in the freight blockade.

There is little telling, of course, how the camp is going to hold out, but the prospects are now that it will be permanent and rich.

Silver.

If silver keeps on the down grade in price some more of the big mines of Butte, Montana, will have to cease operations. The Clear Grit and Black Rock closed last week. The Granite Mountain of Montana and the Ontario of Utah are two of the great silver mines of the country which can keep on some time longer, but few others can.

The outlook for silver at this session of Congress does not appear to be very good and its friends are not so hopeful as before the session commenced.

The gradual drop in the price of silver is very discouraging to the miners in the silver camps. As there are more silver mining camps than gold this greatly affects the mining industry. In some of the big camps work is bound to give out for the men unless there is a change for the better shortly. Not only must those mines now opened curtail operations, but new ones will not be developed until the prospects are better than at present. Ores of gold, copper and lead will be more in demand for awhile until the silver question is settled. It is most unfortunate that it should have got into politics.

IN WASHINGTON.—The gentlemen who form the joint committee representing the interests of the valley men and miners of California have taken the entire lower floor of 510 Thirteenth street, not far from Pennsylvania avenue, Washington. These rooms were occupied by Congressman Camminetti, who very accommodatingly moved to the floor above. The place has been neatly decorated and well stocked with everything that is supposed to enter into true California hospitality, and in the reception rooms open house will be kept until the committee concludes its labors in Washington.

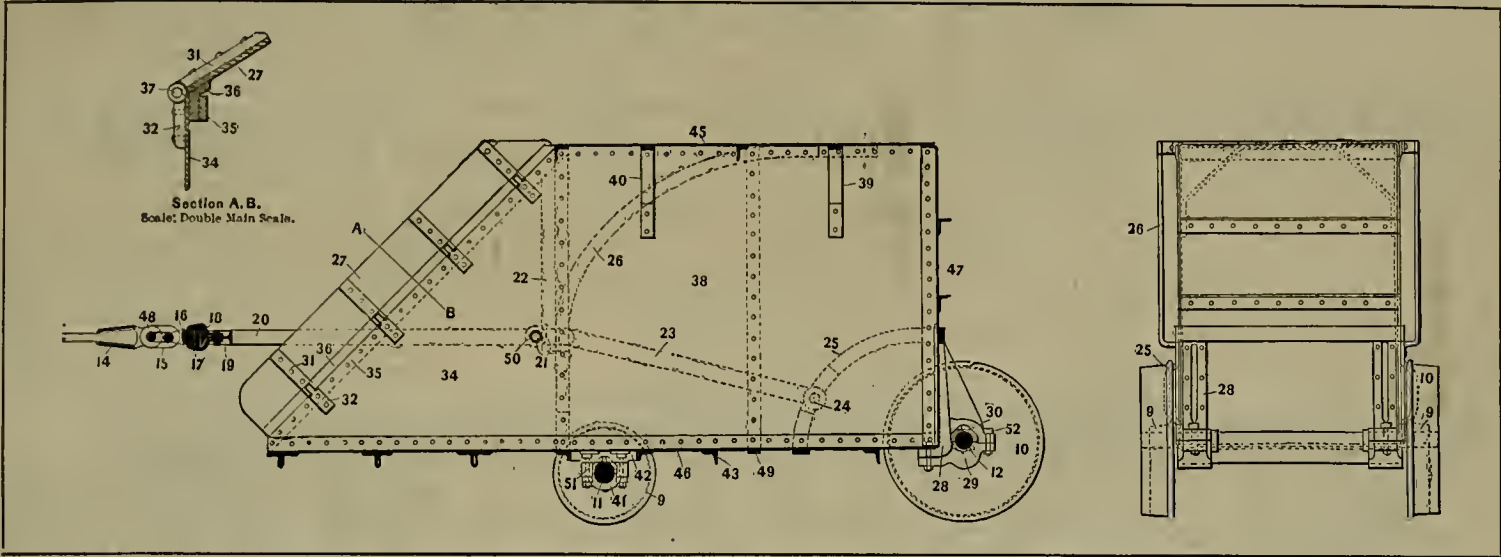
Mine Hoisting Cars.

Not long since we described the machinery used for handling and preparing coal at the Cross Creek Collieries, making extracts from a paper read before the American In-

stitute of Mining Engineers by Eckley B. Coxe, of Drifton, Pa. In that same paper he describes the "gunboats" used for hauling the coal from the bottom of the mine like an ordinary skip. The cars only circulate on the level gangways and are dumped into the gunboat at the bottom of the slope or other convenient point on it. The dumps employed at the bottom of the slope for dumping the mine cars into the

is prevented, however, by the curved arm (4), for the line joining the two pins in the curved arm passes to the left of the shaft connected with the lever, and therefore prevents the cradle from rising; but, if the lever (8) is thrown to the left, the cam (6), which

turn to a horizontal position, but are prevented by the hook in the lower end of the arm (4), which rests against the lever-shaft until the lever is thrown in the opposite direction, thus again bringing the line of thrust of the bar (4) to the right of the



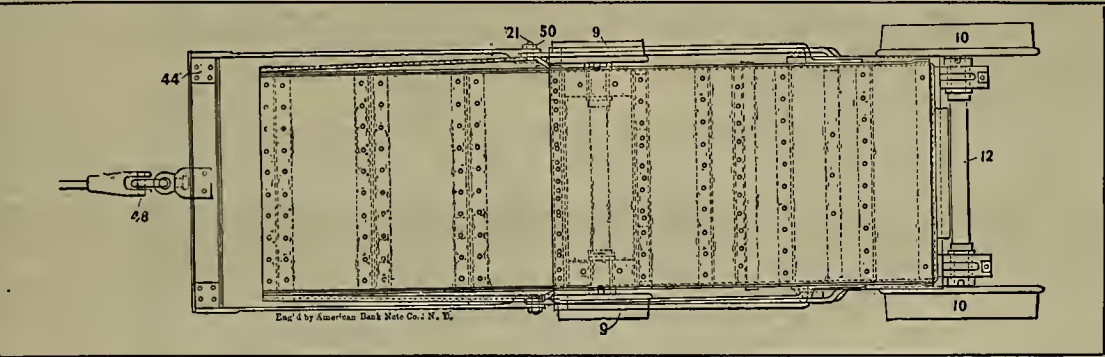
SIDE AND END ELEVATION OF "GUNBOAT" FOR STEEP INCLINE HOISTING.

stitute of Mining Engineers by Eckley B. Coxe, of Drifton, Pa. In that same paper he describes the "gunboats" used for hauling the coal from the bottom of the mine.

gunboat is shown in the accompanying plate. It consists essentially of two cast-iron sides which form the track and which are connected by two bars, which hold them

is on this shaft, moves the bar (5) to the left until the joint between bars (5) and (6) is thrown to the right of the line connecting the center of the shaft and the point of con-

central shaft, and allow the cradle to return to the position from which it started. The empty car is then taken away and another put in its place. By the rolling motion they are enabled to place the car in the cradle before the gunboat arrives, without having the car come in contact with the gunboat, so that the cars can be changed and the loaded car brought on to the cradle while the gunboat is being hoisted. In this way, hoisting can be done very rapidly, the car being always ready; and the only thing to be done by the man in charge of the dump, when the gunboat arrives, is to throw the lever over so as to break the toggle-joint. The coal slides very rapidly into the gunboat; he then reverses his lever, the car goes back to its first position and the gunboat can be immediately hoisted. This dump is very effective, allowing one car a minute to be very easily dumped into the gunboat and hoisted. There are two gunboats and two tracks; but the two tracks come together at the bottom, so that both gunboats run into the same dump. In the drawing, 2 is the cradle; 3, curved

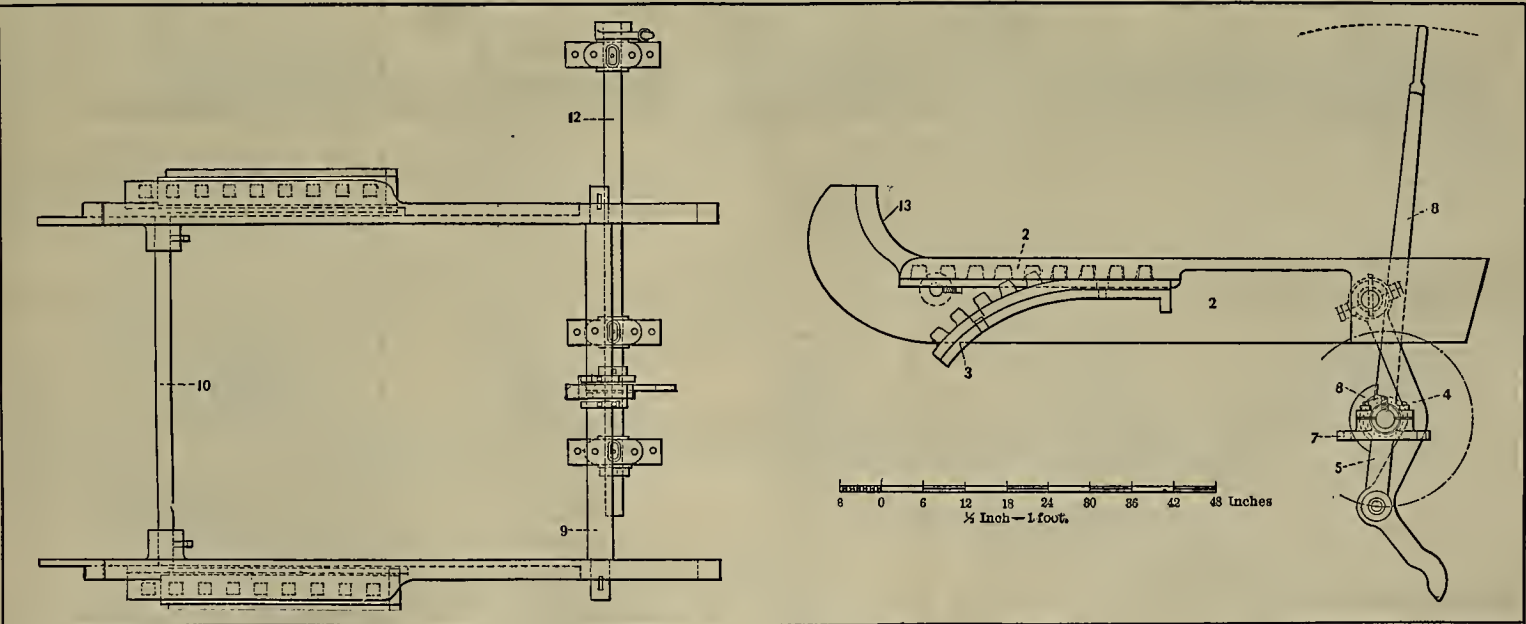


PLAN OF "GUNBOAT" FOR HOISTING ON STEEP SLOPES.

slope to the top of the breaker. The slope known as No. 2 is very steep, over 60 degrees, and the breaker is situated at the mouth, so the two tracks run directly to the

at the proper distance apart. Upon the sides of each of these cast-iron bars there is a horizontal rack, and upon the timber frame there is a curved-toothed segment.

When this position is reached there is nothing to prevent the shaft from turning still farther to the right and the cradle



MINE CAR DUMP.

top of the breaker. It is found not to be economical to hoist the coal in the mine cars for several reasons. They, therefore, when the pitch is over 30 degrees, prefer to hoist with the "gunboat" shown in the cuts. This is the local name for an iron car much

When the car is placed on the iron frame, which is known as the cradle, so that the front wheels touch against the horn (13), which is curved upward, the center of gravity of the whole mass is such that the car and cradle tend to roll down and dump. This

from rising up, which allows the car to come into a dumping position; and the gate of the car being opened by a latch-lifter, the car empties itself into the gunboat. The cradle is so constructed that, when the car is emptied, the cradle and car tend to re-

rack; 4, locking arm; 5, connecting link; 6, cam; 7, pedestals; 8, hand-lever; 9, back cradle-shaft; 10, front cradle-shaft; 12, lever and cam-shaft; 13, horn. By reference to the cuts of the gunboat and the figures, its construction may be

seen. The parts are as follows: 9, front wheel; 10, back wheel; 11, front axle; 12, back axle; 14, rope socket; 15, link connecting rope socket and swivel; 16, swivel; 17, clamp over pulling beam; 18, head of swivel pin; 19, spreader bar; 20, front pulling bar; 21, pin for front pulling bar; 22, front side stiffeners; 23, back pulling bar; 24, pin for back pulling bar; 25, stirrup for pulling bar; 26, guard for pulling bars; 27, wings on mouth of gunboat; 28, pedestal for back axle; 29, pedestal cap for back axle; 30, brass-bearing for back axle; 31, long side of hinges for wings; 32, short side of hinges for wings; 34, angle part for side sheet; 35, stiffeners for mouth at wings; 36, rest for wings; 37, pin for wing hinges; 38, side sheet; 39, back brace for inside; 40, front brace for inside; 41, pedestal cap for front axle; 42, pedestal for front axle; 43, angle-iron stiffeners; 44, riveting plate on spreader bar (19), 45, top sheet; 46, bottom sheet; 47, back sheet; 48, pin in cone socket; 49, side and bottom binder; 50, nut on pin for front pulling bar; 51, bolts for front pedestal cap; 52, bolts for back pedestal cap.

Cause of Geological Climates.

Mr. Manson's Reply to Mr. Lindgren's Criticism.

SAN FRANCISCO, Feb. 14, 1892.

TO THE EDITOR.—In your issue of Feb. 6, 1892, occurs a communication from Mr. W. Lindgren of the U. S. Geological Survey, criticising a recent paper by the undersigned, which paper is entitled "The Cause of the Glacial Period and an Explanation of Geological Climates." [Proc. Technical Soc., Vol. 8, Sept., 1891.]

Mr. Lindgren admits that he does not attempt to discuss the theory of the author regarding the cause of the glacial period, but confines his criticisms to a denial of the facts cited by the author in support of that branch of his theory which relates to the glacial period, and an endeavor to show that the deductions are not sustained by geological investigations, but are actually shown to be erroneous.

The author regrets that Mr. Lindgren should have thus restricted his criticism: for the argument applies not merely to the glacial period, but to the whole range of geological climates; and the facts adduced by the author in support of this latter and more comprehensive branch of his theory—and not controverted by Mr. L.—are, in an eminent degree, corroborative of the former branch of the theory.

Mr. Lindgren admits that during the quaternary period ice covered certain parts of North America and Europe in thick sheets. These thick sheets, according to Geikie* and Wright† covered three-fourths of these continents. The evidences relied upon to establish this extension are really evidences and lines of glacial retreat, rather than of maximum glacial extension in a milder form. The thickness of these sheets was measured not only by hundreds of feet, but in places by thousands of feet; under these conditions it is not unwarranted, in the face of wider evidences of local glaciation as in Virginia and Colorado, to show that milder glaciation may have occurred to a considerable extent over the remaining continental areas of Europe and North America. Asia being in the same latitude, and glacial phenomena of enormous extent having been partially explored, must have been similarly glaciated in corresponding latitudes. The author does not wish it to be understood that every individual square mile of each continent was under ice, as much bare land is known to exist in Greenland now, although that continent is usually referred to as glaciated. But he does mean that the greater portion of each continent has been glaciated.

There were unquestionably areas of considerable extent which escaped glaciation, such as the great "unglaciated area" of the Yellowstone basin. This region was protected from glaciation by a local cause. This cause was the vast and continuous output of earth heat in the lava beds covering portions of Wyoming, Idaho, Oregon and Washington, the protected region being in the immediate path of the currents of air traversing the earth from west to east, and parallel with the lines of cyclonic movement, charted in each number of the Monthly Weather Review and noted in Proc. of Technical Society, Vol. 8, June, 1891.

This heat caused the precipitation upon

the unglaciated area to be warm rains instead of snow. To it the animals of the tertiary period retreated, as glacial conditions surrounded them. Here they were able to survive and develop, and hence the great abundance of their remains in this region.

The cause of this great lava outflow was due to the weakness of the crust at this point and to the disturbance of the previous equilibrium by the load of glacial ice on adjacent land areas and the load of sediment deposited upon the floor of the ocean by the Columbia river.

There is a combination of facts establishing the truth of this explanation which puts it beyond dispute, but it is not necessary to introduce them here.

So far as concerns the restriction of glaciation in California to the 4000 foot contour above present sea level, the author refers Mr. L. to Prof. Le Conte, who reports glacial gravel in the hills back of Berkeley, and to a critical examination of Livermore valley and the canyon of Alameda creek.

Should Mr. Lindgren be in doubt as to the glaciation of the valley of the Amazon over areas where a mean annual temperature of 76° Fahr. now prevails, the author would refer him to Geological Sketches Agassiz, pages 154 et. seq.

Also to *Geology and Physical Geography of Brazil*, Prof. Ch. Fred. Hart of Cornell, pp. 22, 28-9, 217, 469-70, 558.

Prof. Hart went to Brazil believing even Agassiz wrong, but, instead, corroborated Agassiz in the strongest manner.

With regard to the Glaciation of Southern Asia, in India, reference may be had to the following papers: *Jor. Geol. Soc. London*, Vol. XLVI, p. 66; *Mem. Geol. Survey India*, Vols. XXII and XIV; *Record Geol. Survey India*, Nov. 1880; *Jour. Asiatic Soc. Bengal*, Vol. XXXVI, p. 113.

For Australian Glaciation: See—*Climate and Time*, Croll, p. 295; *Am. Jour. Sci.*, Vol. 32, 3rd series, p. 244; *Proc. Linnean Soc.*, N. S. W., May, 1886.

For South African Glaciation: See—*Geol. of South Africa*, Stow; *Quart. Jour. Geol. Soc. London*, Vols. 17 and 18.

As regards the synchroglacial of these continents, the author accepts the observed facts and the natural and legitimate deductions from known laws, in the absence of any conclusive evidence or demonstration to the contrary.

Geologists have not proved by observed facts that any of the great eras of climate, from the Archæan to the Psychozoic era, were synchroglacial in their occurrence from Pole to Pole, nor even upon continents in the same latitude; nor, again, have they proved the contrary.

The demonstration in this discussion presented by the author, shows that such occurrence must have been synchroglacial, and the observed paleontological evidence substantiates this demonstration—the order of climates being everywhere the same.

The evidences upon which to base a glaciation occurring during the Permian and Carboniferous ages, so far as the author is aware, are of a very obscure and meager character; and occurring between strata containing fossils of an ultra torrid or torrid character, are extremely doubtful. Had these evidences occurred between strata containing fossils indicative of a gradual approach to temperate climates (as do Cenozoic glacial phenomena), the evidence would be more entitled to credence.

The proneness to ascribe glaciation to the recurrence of certain mild astronomical influences, pointed out by Adhmar, Croll and Ball, accounts for much imaginary glaciation in the minds of glacial enthusiasts.

MARSDEN MANSON.

ANTIMONY SMELTING.—Burke Bros., builders and contractors of Reno, have just completed a new furnace for the Boston Antimony Mining Co., whose mines and works are situated at Black Knob, east of Lovelock, in this county. The *Reno Journal* says the furnace is built in accordance with the designs of Dr. H. H. Hutchins, superintendent of the mines, who has had much experience in smelting antimony. It is expected to produce five tons per day of star antimony from the ores now being mined at Black Knob. James Burke, one of the firm of Burke Bros., says the furnace is in running order, but it is deemed advisable to let it dry a day or two before firing it up. He also states that the company has a number of mines near the smelting works which are producing high grade ore, and the indications are that a lively mining camp will spring up at Black Knob.

MANGANESE IN CAST IRON.—As manganese in cast iron increases beyond 50 per cent, the mass cracks in cooling, and when it approaches 98 per cent the mass crumbles or falls to pieces.

The California Miners' Association.

Officers, Committees and Constitution and By-Laws of the State Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized.

The officers of the Association are as follows:

HON. J. H. NEFF.....President.
W. C. RALSTON.....Secretary.
THOS. B. EVERETT.....Ass't Secretary.
H. PICHOL.....Treasurer.

NAME.	VICE-PRESIDENTS.	COUNTY.
R. F. Grigsby.....		Napa
Henry Martin.....		Trinity
Geo. W. Thomas.....		Marin
Frank R. Wehe.....		Sierra
Woolston Banghart.....		San Mateo
R. H. Campbell.....		Siskiyou
Jas. O'Brien.....		Yuba
Frank Fitzgerald.....		Inyo
A. B. Call.....		Amador
Dixon Brabban.....		Plumas
J. F. Ryan.....		Humboldt
Aaron Bell.....		Shasta
H. O. Harvey.....		Sacramento
D. K. Perkins.....		Butte
A. M. Hardie.....		San Luis Obispo
A. Tregidgo.....		Nevada
Ex-Gov. H. G. Blaisdell.....		Alameda
T. B. Morse.....		Calaveras
Hon. A. M. Clark.....		Fresno
Hon. J. K. Luttrell.....		Sonoma
J. J. Crawford.....		El Dorado
R. M. Folger.....		Mono
Geo. F. Hoyte.....		Orange
R. McMurray.....		San Francisco
W. S. Chapman.....		San Francisco
I. C. Stump.....		San Francisco
C. T. Lacy.....		San Francisco
A. J. Ralston.....		San Francisco
John W. Maxwell.....		Tuolumne
Hon. R. Clark.....		Colusa
C. F. Reed.....		Placer
Chas. Bogan.....		Mariposa
James H. Lawrence.....		Merced

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Louis Glass, San Francisco.	Jas. Tunstead, Marin.
Col. Dan M. Burns, S. F.	A. M. Bryant, Mono.
Col. F. McLaughlin, Butte.	W. K. Alderley, Napa.
S. K. Thornton, S. F.	Chas. Bogan, Mariposa.
Wm. Ireland Jr., S. F.	Jas. H. Lawrence, Merced.
Hon. O. W. Cross, Nevada.	Hon. J. M. Walling, Nevada.
Chas. G. Yale, San Francisco.	D. C. Pixley, Orange.
J. B. Hobson, Placer.	John Spaulding, Placer.
Hon. Edw. Coleman, Nevada.	W. W. Kellogg, Plumas.
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E. W. Fogg, Butte.	George M. Finney, Sierra.
John F. Davis, Calaveras.	R. G. Hart, Shasta.
John Boggs, Colusa.	A. Hewell, Sonoma.
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	O. G. Mayo, Yuba.

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Wm. Ireland Jr., S. F.	S. K. Thornton, S. F.
N. J. Brittan, San Mateo.	John Hays Hammond, S. F.

COMMITTEE TO FORMULATE AND PROMOTE THE ADOPTION OF AMENDMENTS TO MINING STATUTES.

Hon. Niles Searies, of Nevada.	Ne-J. M. Fulweller, Placer.
Hon. C. W. Cross, S. F.	H. I. Thornton, S. F.
	Hon. J. K. Luttrell, Sonoma.

COMMITTEE OF CONFERENCE WITH RIVER AND HARBOR CONVENTION COMMITTEE.

R. G. Hart, Shasta.	Wm. Ireland Jr., S. F.
Frank McLaughlin, Butte.	J. B. Hobson, Placer.
Hon. J. K. Luttrell, Sonoma.	

DELEGATES TO WASHINGTON.

Hon. Niles Searies, of Nevada County.	
Hon. J. K. Luttrell, of Sonoma County.	
Robert McMurray, of Nevada County.	
J. B. Hobson, of Placer County.	

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

Sec. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of this organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of eleven members selected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

Sec. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

Sec. 3. The President and Secretary of the Association shall be ex officio President and Secretary of the Executive Committee.

Sec. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of the Association.

Sec. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein prescribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

Sec. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall render annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

Sec. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by the President and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of the Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at the city and county of San Francisco.

Sec. 2. It shall be the duty of the Vice-Presidents of this Association to at once proceed to the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

Sec. 3. All persons friendly to the mining interests are eligible to become members of this Association. In the event that there is no County Organization, such person may unite with the State Association by forwarding his name to the Secretary thereof, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

Sec. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected as such County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by the Executive Committee, Jan. 22, 1892.

BY LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittees as they may determine. They shall fill all vacancies of the officers of the Association or members of any committee. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

Sec. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of the annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

Sec. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

Sec. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

Sec. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

Sec. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of such intended meeting.

Sec. VII.—The Secretary and Treasurer shall receive such compensation for their services as the Executive Committee may, from time to time, determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22d, 1892.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F., Stock Exchange Building.

* The Great Ice Age.

† The Ice Age in North America.

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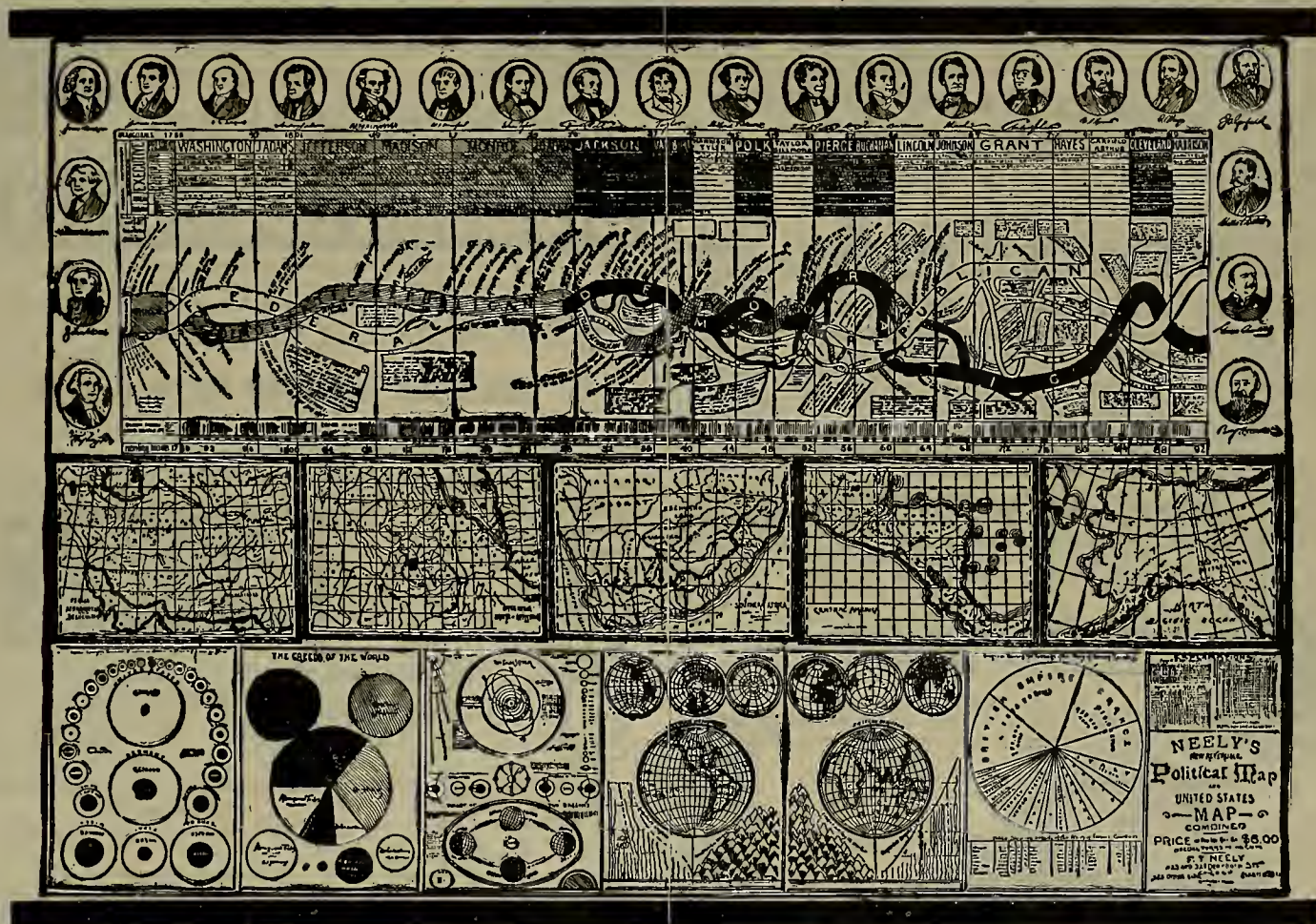
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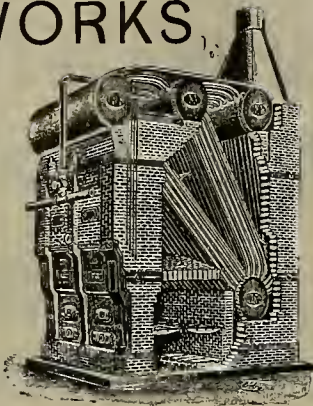
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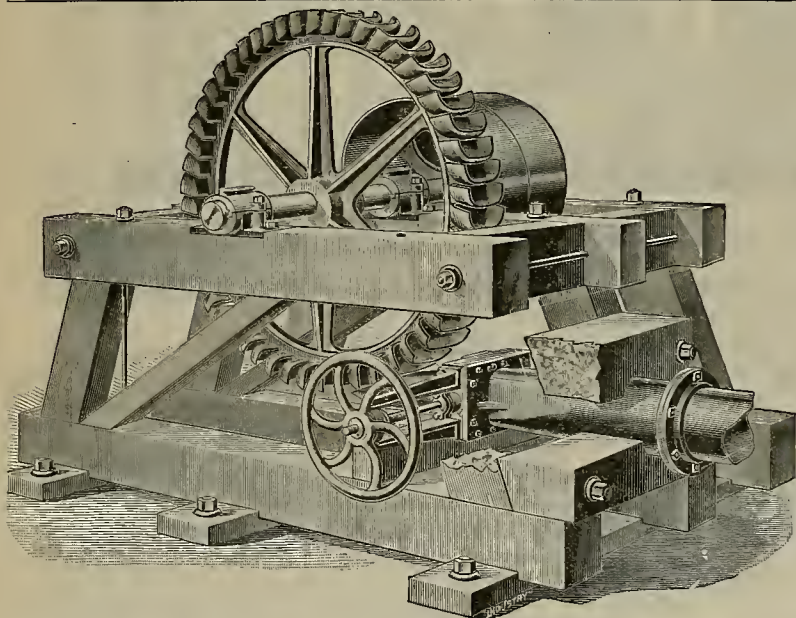
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The Smyrna Fig Insect.

The Reason Why All Attempts to Introduce it into California Have Failed.

SAN FRANCISCO, Feb. 20, 1892.

TO THE EDITOR:—Since the experiments conducted by George Roeding in Fresno have shown that the fecundation of the pistillate flowers is sufficient to produce an article equal to the Smyrna fig, several attempts have been made to introduce the insect, which in Smyrna is used to perform this office. This insect, already mentioned by Theophrastus, and for more than 3000 years known by the name *Psen*, belongs to the genus *Blastophaga*, one of the gallwasp family.

This insect carries the pollen of the staminate flowers to the stigma of the pistillate ones, of course unintentionally, because its real object in entering the fig is a very different one.

Before pointing out the cause of failure in the introduction of this insect, it will be necessary to discuss some generalities in the biology of the gallwasps, so that the nature of the mistakes may be discovered and in further experiments avoided.

All gallwasps known, produce but one generation a year; this statement refers only to gallwasps, not to gellflies (*Cecidomyia*), which develop several, and Aphidid gell-builders (*Eriosoma*, *Pemphigus*), etc., which develop many generations.

The gallwasp begins its career as a maggot, in spring. This maggot comes from an egg laid by a wasp, hibernates and also impregnated for considerable time. The wasp is at all times ready to lay the egg, and the moment of laying it depends entirely on the development of those vegetable organs on which the gall, the future habitation of the maggot, has to be formed.

The gall, or the swelling which is formed by the sting of the wasp inserting the egg, is of different shapes and sizes, according to the species of the insect; and as the celebrated entomologist, Baron von Osten-Secken, has observed, in some North American species, differs even in regard to the two sexes.

How the infinitesimal quantity of liquid inserted by the sting of the mother wasp is able to produce such a variety of forms, distinct according to species, and always the same in the same species, is one of the mysteries connected with the biology of this interesting group of insects.

We abstain here from all speculation about cause and effect, and state only the facts of practical importance.

The life of the gallwasp, in its maggot stage, is not a long one. Those of the Northern Temperate zone are, without exception, found in their winged state at the end of August. The tropical species are little studied, and the Southern hemisphere, although abounding in gallbuilders of other classes, exhibits but the few Australian gallwasps described by Schrader.

It is another curious instance in the life of the gallwasps that although winged, and otherwise perfectly qualified for out-door life, it does not quit its habitation, but remains inside the gall without food, and the monothalamous species, viz., *Cynips quercus folii* L., even without mate.

Another element of mystery that enters the biology of these little beings is their propagation. We know the females of every species, but there is a considerable number whose males never have been found. The males of some species are wingless. Now the reverse, i. e., winged males having wingless females, is of frequent occurrence in the insect kingdom, but a wingless male belonging to a winged female is of rather rare occurrence, and may under these circumstances be explained by the necessity of planting the eggs for the next generation on the exact spot and under the conditions which are indispensable for their development. A great many tropical relations of the *Blastophaga* possess such imperfect males. It is possible also that males exist even more imperfect than the wingless ones, never developing beyond the maggot form, although sexually perfect. We notice analogous phenomena in the history of the life of parasitical wasps, viz., *Microgaster* and other relations of *Ichneumon* and *Ophion*, etc., amongst whom in many cases males have not been observed. But there still remains the mystery of the monothalamous females, like *Cynips Agamos*, because it is difficult to imagine how the single inhabitant of a gall can be impregnated, and I incline very much to the theory that these instances of mateless females rest on imperfect observations. In these instances of mateless females the males exist perhaps even in the winged form of their mates but are very short lived and disappear before

autumn, several months before we find the impregnated females crawling on the bark of oak trees and waiting for the budding of leaves into which to insert their offspring.

But this has little to do with our present object. We want to state—

I. That like the rest of the gallwasps the fig insects, *Blastophaga*, exist in their perfect state early in the fall;

II. That like the rest of the gallwasps it hibernates in the gall without food;

III. That this condition extends up to the time when the fig tree produces its buttons.

Now arises a complication. The *Blastophaga* partakes of the peculiarity of many organisms. It is capable of a limited degree of adaptation to abnormal circumstances under whose influences it develops an abnormal generation.

Caprification, practiced from time immemorial, rests on this peculiarity.

Let us now trace the history of the *Blastophaga* from the moment when the young brood in spring is planted by the impregnated female.

The female dies like a majority of insects does after this biological process, and old Theophrastus, who observed 3000 years ago the *Blastophaga*, states this phenomenon in his matter-of-fact style by saying: "They disappear from the fig, some leaving a wing, others a leg inside as a proof of their former presence."

The little insects die, but their offspring survives, and if left alone, develops about August, but remains in the wild fig in which it hibernates and shares its fate to repeat the cycle of its own biology by entering, in spring, a budding wild fig and implanting into it its progeny.

That is the regular course, but if interfered with by caprification, viz., by the wild fig containing its offspring, the *Blastophaga* in its maggot state being removed from the tree and hung up on the domesticated fig, then, an abnormal development will succeed the interruption of the vegetable process on which the existence of the insect depended.

We ought to have stated before that the gallwasp maggot depends as much on the gall which it inhabits as the gall itself depends on the plant on which it grows. If the gall is separated from the plant, the gall begins to shrink in most instances. Its inhabitant, the maggot of the gallwasp, then dies, and this circumstance is the most serious obstacle in studying the life history of these insects as any practical entomologist has experienced; but there are a few species which, under such circumstances when already developed to a certain degree, are able to hasten their transformations in the same way as caterpillars when suffering from want of food, although not yet fully prepared, will undergo their transformation and yield a moth somewhat depauperated and generally sexually immature.

The same phenomenon takes place in regard to *Blastophaga* when used for caprification; the withering fruit of the wild fig tree, inhabited by the *Blastophaga* maggot, accelerates its transformation, the wasp emerges from the wild fig, and, following its instinct, enters the domesticated variety, where, by its movements, it carries the pollen to the pistils and fecundates the seeds. It serves to propagate the plant, but is not able to propagate its own species. We will leave here all speculation as to the causes of such a series of interesting biological phenomena, and will draw only our conclusions in regard to practical horticulture.

I. The generation accelerated for the purpose of caprification perishes, i. e., it is useful for caprification but not for the reproduction of its own species.

II. If we do not want to go to the trouble of introducing the *Blastophaga* every year, we have to introduce the normal generation and colonize it on the wild fig, from which we may then draw our annual supply.

III. The normal generation can only be introduced during its hibernation, because that is the only time when the gall being ripe serves merely for protection, not for food.

As to the introduction of *Blastophaga*, we need not go to Smyrna. Lower California and New Mexico possess at least one species of *Blastophaga*. The keeping of the introduced insect during the first winter requires merely a cool place and some simple precaution to prevent escape, so that the insect may not get to wrong places, where it would perish without having left an offspring for the next year. H. H. BEHR.

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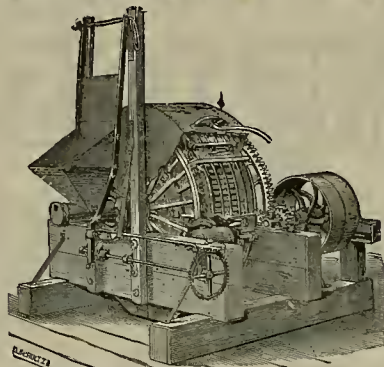
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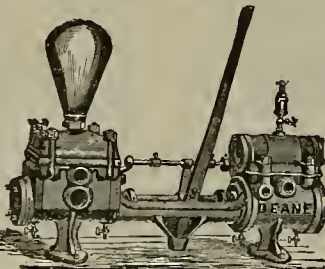
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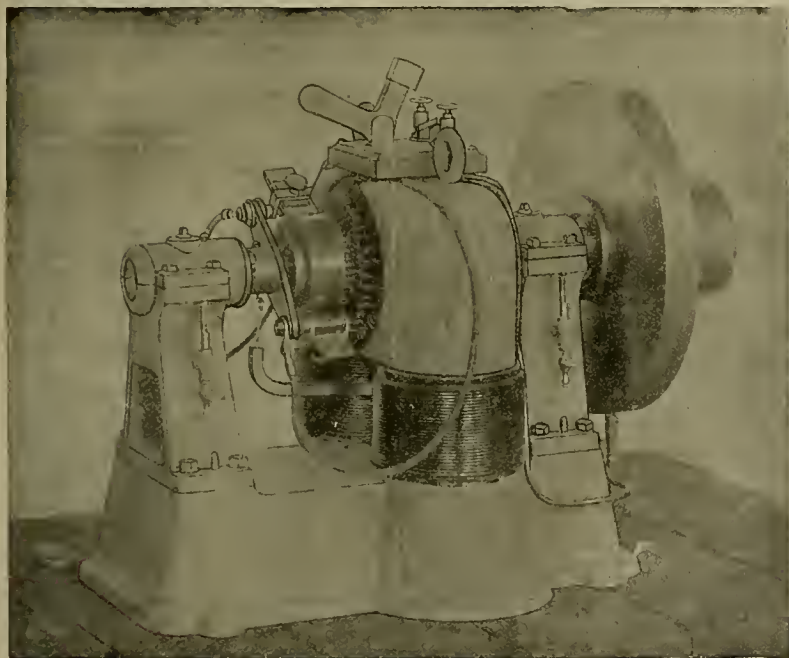
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING FEB. 16, 1892.

- 468,786.—VENTILATOR—A. B. Brown, Los Angeles, Cal.
 469,120.—ORE CRUSHER—J. Brumbaugh, Gold Hill, Or.
 468,985.—SEWER GATE—John Downs, S. F., Cal.
 468,986.—CULTIVATOR—G. W. Forbes, Guberville, Cal.
 468,982.—STEAM COOKER—J. H. Howard, Pasadena, Cal.
 468,989.—SWIMMING APPARATUS—E. R. Mallett, S. F.
 468,890.—CAP AND FUSE COUPLER—K. McFarland, Clackamas, Or.
 468,824.—MOTOR FOR STREET CARS—A. J. Painter, Pasadena, Cal.
 468,093.—ELECTRIC ARC LAMP—H. Sawyer, S. F.
 468,937.—VISCID FATTY COMPOUND—A. Sommer, Berkeley, Cal.
 468,838.—BUILDING BRICK—L. A. Steiger, San Jose, Cal.
 468,839.—PAVING BLOCK—L. A. Steiger, San Jose, Cal.
 468,840.—INTERLOCKING BRICK—L. A. Steiger, San Jose, Cal.
 468,841.—ELEVATED RAILWAY—G. A. Stephenson, Los Angeles, Cal.
 468,842.—ELEVATED RAILWAY MOTOR—G. A. Stephenson, Los Angeles, Cal.
 469,187.—STEAM STAMP—C. W. Tremain, Portland, Or.
 468,979.—FLUISING APPARATUS—Frank Walker, Los Angeles, Cal.

The following brief list by telegraph, for Feb. 23, will appear more complete on receipt of mail advices.

Elmer Bowen, Los Angeles, automatic car coupling; William F. Buswell, San Francisco, pulley; Frederick W. Cook, San Francisco, gang edger; James E. E. Depe, Oakland, ledger, sales and billing book; Frank H. Disbrow, Glendora, stoning knife; Peter B. Donahoe, Fresno, street sweeping machine; John H. Driller, Los Angeles, automatic funnel cut-off; Thomas Fuller, Angels Camp, safety device for mining cars or elevators; James H. Hawthornthwaite, San Francisco, amalgamator; William Holder, Mokelumne, atmospheric bed covering; Robert W. Jessup, Alameda, seed cleaner; Alexander J. McAdam, San Francisco, hydraulic elevator; C. Vogel, San Anselmo, conduit for cable and electric tramways; John W. Pack, San Francisco, hydraulic motor; John A. Peron, Ferris, inhaler and respirator; William Smith, Berkeley, electric railway.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ELECTRIC ARC LAMP.—Houghton Sawyer, S. F. No. 469,093. Dated Feb. 16, 1892. This invention consists essentially in a lamp containing a magazine for holding the upper and lower carbons, which carbons, by suitable means, may be thrown successively and respectively into a pair of carbon holders as required. It also consists in the novel construction and arrangement of the magazine, the carbon holders which receive the carbons from the magazine and the devices for releasing the burned carbons and introducing and holding a fresh pair of carbons. The object of the invention is to provide what may be termed a magazine arc lamp automatic in its action and capable of carrying a number of carbons and supplying them successively to a pair of holders whereby a light may be had for an indefinite period of time without having to replenish the carbons by personal attention.

CULTIVATOR.—George W. Forbes, Guberville, Santa Clara Co. No. 468,986. Dated Feb. 16, 1892. The object of this invention is to raise both ends of a wheeled cultivator equally and level without strain on the neck yokes of the horses to secure the tooth shanks in a simple and effective manner, consistent with rigidity of the frame beams, to secure the several connecting lugs and arms in a way at once simple and effective, and generally to provide a durable and readily operative and adjustable cultivator.

SWIMMING APPARATUS.—Edmond R. Mallett, S. F., assignor of one-half to John Baumann. No. 468,989. Dated Feb. 16, 1892. This novel apparatus for swimming purposes consists of a flexible supporting structure adapted to be fitted to the body of the individual and rotary propellers or screws mounted on suitable framework and attached to this support with a mechanism by which the propellers may be rotated, and cords connecting this mechanism with the feet of the swimmer, so that by the movement of the feet the propellers are kept in operation.

SEWER GATE.—John Downs, S. F. No. 468,985. Dated Feb. 16, 1892. This invention relates to the class of doors or gates for sewers for the purpose of preventing the back-flow of tide or other water which may accumulate in the sewer, and also to prevent sewer gas passing from the main sewers into houses through the side connections. The object of the invention is to provide a simple and effective gate of this class especially adapted for side sewers, and which will prevent the back-water from getting into said side sewers, and will also answer for a trap to prevent the sewer gas from passing into and through said sewers into buildings or street openings which convey surface water into the sewers.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, February 25, 1892.

General trade continues slow, but everything points to more activity soon after assessment day. Iron workers are quite confident of an active season. They are generally well supplied with orders for immediate work, while some report orders ahead. The very favorable outlook for grain crops, gives assurance that a large tonnage will head this way for wheat cargoes which will insure liberal supplies, and at easy prices, of raw material, iron, coal, etc. The money market is fairly easy at current rates of interest. New York continues to report a plethora of funds. Foreign money markets are reported feverish with more or less stringency owing to a want of confidence. Securities are closely scrutinized.

MEXICAN DOLLARS.—The market is fairly firm at around 7 1/2 cts.

QUICKSILVER.—Receipts the past week aggregate 456 flasks. The market is easy at quotations. The overland shipments in last month via S. P. R. R. aggregated 59 tons. During the past week the exports via sea were 200 flasks to Mexico, 120 to Central America and 1200 to New York via Canadian Pacific.

SILVER.—The market shaded off the forepart of the week but toward the close it is strengthening. New York quotations came through to-day at 91 cts. The general statistical situation of the metal favors a higher range of prices. Continued monthly purchases of 4,500,000 ounces by the United States and a steadily decreasing output of the mines, are helping the surplus in the country which, even with no other influence, will soon act favorably on the markets in the United States and Europe. India's extraordinarily large purchases in 1889 and 1890 are about exhausted, which will soon cause that country to buy more heavily. There is everything at this writing to warrant the assertion that Portugal and also the Argentine Republic in regaining the surplus in the country which, even if adopted silver to a very great extent, Austria Hungary will not dispose of all the silver now held, but keep enough to mint fractional coin for general use. It seems Congress, will act soon on the free coinage bill. It is asserted by those who should know, that both branches will pass a free coinage bill.

ANTIMONY.—The market continues slow at easy prices.

BORAX.—Receipts the past week aggregate 365 casks. Overland shipments last month via S. P. R. R. were as follows, in tons: From San Francisco, 17; Oakland, 37; and Sacramento, 143. The market is steady at combination prices.

LIME.—Receipts the past week aggregate 2884 bbls.

IRON.—Imports the past week aggregate 1500 pigs from Sydney, and 33,605 boxes of iron from Swansea. The local market is unchanged. The same conditions reported last week still continue. The East and Europe report a stronger tone, with holders inclined to bullishness.

COPPER.—Exports by sea the past week aggregate 67,855 lbs. copper matte to New York. Overland shipments in last month by the S. P. R. R. aggregated as follows: From Los Angeles and south (Arizona), 1157 tons copper and 121 tons copper cement. There were also 13 tons of cement sent from Stockton. The Iron Age reports the New York market barely steady, owing to large available supplies, and that, too, in the face of heavy sales of Lake.

COAL.—Imports the past week aggregate as follows: Coos Bay, 80 tons; Tacoma, 4300; Newcastle, N. S. W., 321; Liverpool, 10,960; Cardiff, 2240; Departure Bay, 2445; Sydney, 2703; Greenock, 2050; New York, 246; Nanaimo, 2607; Newcastle, England, 1900. Total, 35,247 tons. Continued heavy receipts and a reported falling off in the consumption demand are against spot and nearly due cargoes, while continued favorable crop prospects are against cargoes for shipment.

COKE.—Imports the past week aggregate as follows: Newcastle (England), 519 tons; Antwerp, 500. Total, 1019 tons. The market is barely steady for parcels in all positions.

San Francisco Metal and Coal Market.

ANTIMONY.		THURSDAY, FEBRUARY 25, 1892.	
Per lb.	@	14 1/2	English, lb. 16 @ 20
BORAX.		Canton tool. 9 @ 20	
Refined, in car lots 8 @		8 1/2	Diamond tool 9 @ 9
For sale, in car lots 8 @		8 1/2	Hammer 8 @ 8
Concentrated, do 7 1/2 @		7 1/2	Machine 8 @ 8
All grades jobbing at advance.			Toe Calc. 4 @ 6
COPPER.		TIN PLATE.	
Bolt, 22 @		B. V. steel grade	
Sheeting, 22 @		1/2 doz. spot, 6 @ 60	
Ingot, jobbing, 14 @		Charcoal, 14x20, 6 @ 60	
Do, wholesale, 13 @		Do roofing, 14x20, 6 @ 60	
Fire Box Sheets 22 @		Do, do, 20x28, 12 @ 13 @ 30	
IRON.		PIG TIN.	
Bar, base, 3 @		Spot, B. V. steel grade	
Norway, base, 4 @		ular, nominal, @ 21	
PIO IRON.		COAL.	
Eglinton 30 ton, Spot, Load.		SPT FROM A D—PER TON.	
Glengarnock, 26 @		Wellington, 58 @ 53	
Am. Soft, No. 1, 25 @		Gretton, 7 @ 50	
Oregon Pig, 30 @		Nanaimo, 7 @ 50	
Puget Sound, 30 @		Gilman, 6 @ 50	
Clay Lane White, 25 @		Seattle, 7 @ 50	
Shotts, No. 1, 25 @		Channay, 9 @ 50	
Langlois, 26 @		Egg hard, 14 @ 50	
Thorncliffe, 25 @		Oumherland, in sacks, 15 @ 50	
Cartbarrie, 25 @		Do, bulk, 14 @ 50	
Barrow, 25 @		Wallend, 7 @ 50	
Carzoff, 24 @		Scotch Splint, 8 @ 50	
LEAD.		Brynabe, 8 @ 50	
Per ton, 10 @ 40		West Hartley, 8 @ 50	
SILVER.		AUSTRALIAN PER TON.	
Pig, 44 @		Australian, 7 @ 70	
Bar, 52 @		Liverpool St. am., 7 @ 70	
Sheet, 72 @		Scotch Splint, 7 @ 50	
Pipe, 63 @		Cardiff, 7 @ 50	
(Discount 10% on 50 bags.)		Umlerland, @ 13 @ 50	
Drop, 30 bag, 1 10 @		Egg hard, 12 @ 50	
Buck, 30 bag, 2 10 @		West Hartley, 7 @ 50	
Chilled, 1 10 @		Do, OK, 10 @ 50	
QUICKSILVER.		English, to load, 89 @ 11 @ 50	
Home trade, pr. 43 @ 00		Do, spot, in bulk, 11 @ 00	
For export, @ 39 @ 00		Do, in sacks, 13 @ 00	

Eastern Metal Markets.

New York, Feb. 25.—The following are the closing prices the past week:

Silver in London.	New York.	Copper.	Lead.	Tin.
Thursday, 41 1/16	61	10 75	4 15	19 75
Friday, 41 1/16	60 1/2	10 75	4 15	19 75
Saturday, 41 5/16	61	10 75	4 15	19 75
Monday, 41 1/16	61	10 75	4 15	19 75
Tuesday, 41 1/16	61	10 75	4 15	19 75
Wednesday, 41 9/16	60 1/2	10 75	4 15	19 75

The metal market shows no strength for Lead, but for Copper, Tin and Iron buyers are favored. Quicksilver is weak and slow. Borax is steady. Antimony is barely steady at 11c @ 11 1/2 cts quoted for Hallett's, 12 1/2 cts for LX, and 13c @ 15 1/2 cts for Cookson's.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	NO. AMT.	LEVIED.	DELIN'T.	ANNUAL.	SECRETARY.
Alkali Cones M Co, California.	2	1c.	Jan 16, Feb 20, Mar 9.		R B Keder, Phelan Block
Alta S M Co, Nevada.	41	50c.	Jan 5, Feb 9, Feb 23.		L Osborn, 309 Montgomery
Butte Queen M Co, California.	2	1c.	Jan 26, Feb 20, Mar 28.		V Gadsden, 119 Bush
Cal Verde Antique Marble Co, California.	2	1c.	Feb 2, Mar 7, Mar 23.		W J Gurnett, 348 Pine
Challenger Con M Co, Nevada.	25	1c.	Jan 17, Feb 11, March 9.		O L McCoy, 331 Pine
Chualar M Co, Nevada.	32	50c.	Jan 8, Feb 11, March 3.		C E Elliott, 309 Montgomery
Con Imperial M Co, Nevada.	33	3c.	Jan 22, Feb 25, Mar 15.		O L McCoy, 331 Pine
Evening Star M Co, California.	3	3c.	Jan 20, Feb 22, Mar 12.		J J Scoville, 320 Sansome
Exchequer M Co, Nevada.	32	25c.	Jan 22, Feb 25, Mar 17.		C E Elliott, 309 Montgomery
Golden Fleets Gravel M Co, California.	16	53.00	J 30, Mar 24, May 7.		J W Faw, 310 Pine
Gould & Curry S M Co, Nevada.	63	3c.	Jan 3, Feb 8, March 1.		A K Durbrow, 369 Montgomery
Gold Mountain M Co, California.	1	3c.	Jan 4, Feb 8, Feb 27.		G D Curtis, 215 Grant Ave
Gray Eagle M Co, California.	1	3c.	Jan 11, Feb 15, March 7.		A W Barrows, 303 California
Gusman and California M Co, E. O.	6	83.10	Feb 9, Mar 15, Apr 5.		W J Gleanon, 331 Pine
Imperial M Co, Nevada.	33	3c.	Jan 23, Feb 25, Mar 15.		O L McCoy, 331 Pine
Keystone Con M Co, California.	2	50.00	Jan 30, Mar 7, Mar 23.		J H I ham, 310 Pine
Los Gatos Lime Co, California.	2	25c.	Jan 11, Feb 23, March 25.		W S Somerville, 323 Montgomery
Martha White M Co, California.	1	3c.	Jan 11, Feb 11, March 12.		K L Ross, 120 Sutter
Mexican G & S M Co, Nevada.	41	25c.	Jan 14, Feb 17, March 10.		C E Elliott, 309 Montgomery
Middle Creek G O, British Columbia.	2	5c.	Jan 16, Feb 20, Mar 22.		H D Hawks, 318 Pine
Northwestern G & S M Co, British Columbia.	4	25c.	Jan 15, Feb 24, Mar 16.		F Bonaccina, 433 California
Oakland Con M Co, Nevada.	2	25c.	Jan 8, Feb 16, March 10.		A K Durbrow, 309 Montgomery
Peer Nevada M Co, Nevada.	10	3c.	Feb 1, Mar 15, Mar 24.		E L Barker, 303 Montgomery
Peer N M Co, Arizona.	12	10c.	Feb 24, March 26, April 28.		A Waterman, 303 Montgomery
Pine Hill M Co, California.	1	4c.	Feb 11, March 24, April 15.		Chas A Hare Stewart St
Savage M Co, Nevada.	73	50c.	Feb 2, Mar 8, Mar 28.		E B Holmes, 309 Montgomery
San Francisco M & M Co, California.	10	3c.	Feb 1, Mar 15, Mar 24.		Chas A Hare Stewart St
Santa Clara M Co, Nevada.	10	3c.	Feb 1, Mar 15, Mar 24.		E L Barker, 303 Montgomery
Terikoff G M Co, California.	7	1c.	Jan 2, Feb 2, Feb 29.		W J Gurnett, 308 Pine
Union Con S M Co, Nevada.	45	25c.	Jan 6, Feb 11, March 2.		A W Barrows, 303 California
Weldon M Co, Arizona.	5	5c.	Feb 9, Mar 15, Apr 14.		A Waterman, 303 Montgomery
Yellow Jacket M Co, Nevada.	50	5c.	Feb 2, Mar 4, Apr 2.		W H Blauvelt, Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	MEETING.	SECRETARY.	DATE.
Hale & Norcross M Co, Nevada.	Annual.	A B Thompson, 303 Montgomery.	March 9
Indian Creek M Co, California.	Annual.	S O Mills, 419 California.	March 9
Potosi M Co, Nevada.	Annual.	C E Elliott, 303 Montgomery.	March 9

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Champion M Co.	10.	T Wetzel, 320 Sansome.	Aug 15
Oons Cal & Virginia M Co, Nevada.	50.	A W Haves, 309 Montgomery.	Aug 17
Coptis M Co.	30.	E M Hall, 314 Montgomery.	Sept 10
Eureka Con M Co, Nevada.	10.	H F Buss, 101 Sansome.	Oct 5
Great Western Quicksilver M Co.	25.	A Halsey, 328 Montgomery.	Oct 5
Idaho M Co, Grass Valley.	30.	Grass Valley.	Aug 4
Mayflower Gravel M Co, California.	60.	D M Kent, 330 Pine.	Aug 20
Pacific Coast Borax Co, California.	100.	A H Clough, 230 Montgomery.	Feb 10
Standard Cons M Co, California.	10.	J W Faw, 310 Pine.	Jan 26

Mining Share Market.

SAN FRANCISCO, Feb. 25, 1892.

To outside shareholders mining shares the past week proved to be a Waterloo, for through systematic cross orders the stockpool and mill-rings succeeded in bringing certain shares to very near the low points put out by insiders through their capers before the brokers combine forced them to enter the market as buyers. Outside shareholders who took advantage of the recent rise in prices and sold, have caused to congratulate themselves in the success combine forced insiders to put up the market contrary to their prearranged plan for lower prices. The fight between inside stockpools and mill-rings and the brokers combine is far from ended, and judging from the action of the market the past two months, the outsider who sells when stocks move up, will have no cause for regret. The mines are all right but it is the Comstock system of apportioning bullion to insiders and assessments to outsiders, that is all wrong, and until this is rectified no large up movement in the sharemarket can be looked for.

It looks as if the Quibtoia mine managers are apt pupils of the Comstock mine managers, for the Peer Mining Co. has sent considerable bullion to this city, and it is said has more to come forward, yet a 10 cent assessment was levied on yesterday.

The impression gains ground that in M. W. Fox's suit against the directors of the Hale and Norcross M. Co. and owners of the Nevada Mill & M. Co. the taking of testimony will be through with to-morrow and March 14 is set for argument. So far the defendants have not aided their cause in the testimony of their expert witnesses when subjected to a vigorous examination by W. T. Baggott, the plaintiff's attorney.

The fight for the control of the Hale and Norcross mine does not appear to be ended. Experienced Comstock miners and well informed stock operators are outspoken in their opposition to Mr. Flood getting control. They point to well credited information that the north end Flood and Mackay mines, should be paying dividends. They say that the statement made by Mr. Suro of large deposits of good millable ore in Ophir and two of the other North End mines is thoroughly correct, provided the Con. Virginia Mining Co. has not confiscated it and milled it as their own ore. They also claim that the mill reducing the Con. Virginia ore has an annex, and it is for this reason that car sample assays are not given. The very rich ore reported by Senator Fox when superintendent in Con. Virginia, between the 1300 and 1500 levels is there yet. Why is it not extracted?

Mining shares opened this morning weak but fairly active. After Call, the market shaded off under cross orders, with Hale and Norcross selling down to 8 1/2 cts. Observers and usually well-informed operators there is a well-grounded belief that the market is about bottom for the present, and those who buy and are satisfied with a fair profit will come out ahead. It is thought that Con. Virginia will not move up as high as one or two of the other stocks.

From the Comstock mines, reliable private advices are confirmatory of rich ore being uncovered in Belcher and Crown Point. Official letters do not mention this news, but as prices for the stocks have gone down, it is accepted as proof positive of the private information being correct. Insiders invariably break the market when ready for an upmove or when a rich strike has been made. In the North End group, no effort is being made to develop the rich ore on the 1300-foot level in Sierra Nevada. In Mexican, on the 1465-foot level, near the Ophir line, they have run into the rich ore found to the west about three years ago, at the time the stock went to \$9 a share. In Con. Virginia they are developing for easy working, the various levels extending down from the 800 to the 1300-foot level. In Savage, on the 300-foot level, private advices report them in six sets of timber of good grade ore. In the latter part of 1891, the Virginia Enterprise reported as follows about the work in the Savage mine:

At a point 74 feet north of the south line on the side of the north drift 1500 level, fair-grade ore was encountered, and followed 12 feet, when the drift was turned about 45 degrees to the west, leaving the ore to the east. The drift is about 24 feet farther than the point where they left the ore, and night before last rich ore appeared on the west side. It is pretty certain that the latter strike is the downward continuation of the ore cut into by two west crosscuts on the 1400 level, at a point about the same distance north of the south line. The character of the rock is clearly in every respect, and it is about as rich.

In the same issue the Enterprise said: "Taking the mineral belt from and including the Gould & Curry south to and including the Exchequer—below the 1300 level—a section is opened for prospecting that cannot fail to awaken interest because of its great possibilities, and with the exception of the Bullion, a section that has yielded a great deal of money from the upper levels in years gone by."

Official letters from the Bodie district report an improvement in Mono, and that the mill will soon start up on Bodie ore. Bulwer continues to yield its regular quota of rich ore. The management of Summit

is conforming to the law by giving the width and assay value of ore found. The assay will soon commence hoisting ore. Official letters from the Tucson and Quibtoia districts are about as heretofore reported.

THE ALAMEDA COUNTY BOARD OF TRADE has passed resolutions in which they say that they are in sympathy with the amicable movement of the miners and farmers of California toward the rehabilitation of the hydraulic mining industry on the basis proposed, believing that the interests of the whole State will be greatly benefited by the increased gold product which would result from a reopening of these mines. They also respectfully urge upon Congress careful consideration of the report of its Commission of Engineers, and of the memorial and resolutions of the State Miners' Convention, to the end that these mines may, as soon as possible, be again operated.

SIERRA COUNTY miners will hold a meeting in Downieville March 6th to organize a branch miners' association.

BOOKS ON ASSAYING.

By C. H. AARON.

Part I.—Gold and Silver Ores.

SECOND EDITION—PRICE \$1.

This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in such plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning. The work, like Mr. Aaron's former publications ("Testing and Working Silver Ores," "Leaching Gold and Silver Ores") that have been "successfully popular" is written in a condensed form, which renders his information more readily available than that of more wordy and less conscientious writers. The want of such a work has long been felt. It will be very desirable in the hands of many.

Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay Office; Preparation of the Ore; Weighing the Charge; Mixing and Charging; Assay Lignite; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assay; Examples of Dressing; The Melting in Crucibles; Scoriafication; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ore Containing Coarse Metal; Assay of Roasted Ore for Solubility; To Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; Assay of Special Minerals; Solubility of Metals; Substitutes and Expedients; Assay Tables.

The volume embraces 130 12mo. pages, with illustrations, well clothed in 1892. Price, \$1, postpaid. Sold by DEWEY PUBLISHING CO., Publishers, No. 220 Market Street, San Francisco.

Parts II and III.

Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Etc.

SECOND EDITION—JUST OUT.

Price \$1.75.

This book is entitled "Assaying—Parts II and III," and is separate from Part I, and treats of Gold and Silver Bullion, Lead, Copper, Tin, Mercury, Zinc, Nickel, Cobalt, etc.

Table of Contents:

Gold and Silver Bullion; Apparatus; Melting Bullion; Assaying Bullion; Humid Assay of Silver; Gay Lussac's Method; Volhard's Method; Manipulation; Lead Ores; Copper Ores; Tin Ores; Mercury Ores; Zinc Ores; Nickel and Cobalt; Chromium; Bismuth; Arsenic; Antimony; Sulphur; Salt; Note.

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Assessment Notices.

KEYSTONE CONSOLIDATED MINING COMPANY.
Location of principal place of business, San Francisco, California. Location of work, Amador City, Amador Co., Cal. Notice is hereby given that at a meeting of the Board of Directors, held on Saturday, the 30th day of January, 1892, an assessment (No. 2) of Two Dollars and Fifty Cents (\$2.50) per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 310 Pine St., San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 7th day of March, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 28th day of March, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.
By order of the Board of Directors,
J. H. ISHAM, Secretary,
Office, No. 310 Pine St., Room 43, San Francisco, Cal.

CALIFORNIA VERDE ANTIQUE MARBLE COMPANY.—Location of principal place of business, San Francisco, California. Location of work, Placer County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 24 day of February, 1892, an assessment (No. 2) of One (1) Cent per share, was levied upon the Capital Stock of the Corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, 308 Pine Street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the seventh (7th) day of March, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the twenty-eighth (28) day of March, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
By order of the Board of Directors,
W. J. GURNETT, Secretary,
Office, 308 Pine Street, San Francisco, California.

DELINQUENT SALE NOTICE.

GRAY EAGLE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California. Location of work, Placer County, California.
Notice—There is delinquent upon the following described stock, on account of Assessment (No. 27) levied on the 11th day of January, 1892, the several amounts set opposite the names of the respective shareholders, as follows:

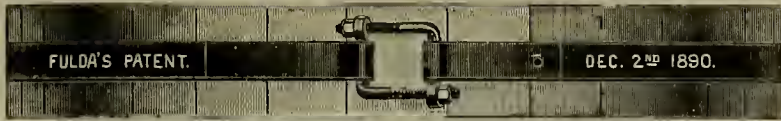
No.	No.		
Names.	Cert.	Shares.	Amt.
Jane A. Armstrong, Trustee.....	582	105	\$ 8 80
A W Barrows, Trustee.....	554	700	42 00
A W Barrows, Trustee.....	565	271	16 25
A W Barrows, Trustee.....	563	500	30 00
A W Barrows, Trustee.....	563	500	30 00
A W Barrows, Trustee.....	564	500	30 00
A W Barrows, Trustee.....	568	1,000	60 00
A W Barrows, Trustee.....	571	100	6 00
A W Barrows, Trustee.....	573	100	6 00
A W Barrows, Trustee.....	599	500	30 00
A W Barrows, Trustee.....	600	300	18 00
A W Barrows, Trustee.....	607	500	30 00
A W Barrows, Trustee.....	610	500	30 00
A W Barrows, Trustee.....	611	500	30 00
A W Barrows, Trustee.....	617	100	6 00
A W Barrows, Trustee.....	618	100	6 00
A W Barrows, Trustee.....	619	100	6 00
A W Barrows, Trustee.....	620	100	6 00
A W Barrows, Trustee.....	621	100	6 00
A W Barrows, Trustee.....	623	300	18 00
A W Barrows, Trustee.....	632	500	30 00
A W Barrows, Trustee.....	645	1,040	62 40
A W Barrows, Trustee.....	655	500	30 00
A W Barrows, Trustee.....	658	100	6 00
J M Buffington, Trustee.....	495	500	30 00
J M Buffington, Trustee.....	503	4,475	268 50
J M Buffington, Trustee.....	522	1,040	62 40
J M Buffington, Trustee.....	612	1,100	66 00
O H Bogart, Trustee.....	448	1,000	60 00
O H Bogart, Trustee.....	449	1,000	60 00
O H Bogart, Trustee.....	450	1,000	60 00
O H Bogart, Trustee.....	451	1,000	60 00
O H Bogart, Trustee.....	453	105	6 30
S E Brown, Trustee.....	267	100	6 00
S E Brown, Trustee.....	312	500	30 00
S E Brown, Trustee.....	316	100	6 00
John Estlin, Trustee.....	137	600	36 00
H L Francis, Trustee.....	591	1,160	69 60
W J Gurnett, Trustee.....	630	21	1 25
T R Horton, Trustee.....	224	200	12 00
T R Horton, Trustee.....	398	1,000	60 00
T R Horton, Trustee.....	399	1,000	60 00
T R Horton, Trustee.....	400	1,000	60 00
T R Horton, Trustee.....	401	1,000	60 00
T R Horton, Trustee.....	402	1,000	60 00
Wm Leviston, Trustee.....	516	5,050	303 00
H M Rosecrans, Trustee.....	39	300	18 00
C B Stout, Trustee.....	476	2,000	120 00
C B Stout, Trustee.....	477	953	57 18
Mrs M E Stout, Trustee.....	170	500	30 00
Mrs M E Stout, Trustee.....	183	100	6 00
W A Searles, Trustee.....	321	250	15 00
W A Searles, Trustee.....	518	1,000	60 00
W A Searles, Trustee.....	542	100	6 00
W A Searles, Trustee.....	543	100	6 00
E S Shanklin, Trustee.....	643	400	24 00

And in accordance with law, and an order of the Board of Directors, made on the 11th day of January, 1892, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 11, No. 803 California street, San Francisco, California, on MONDAY, the seventh (7) day of March, 1892, at the hour of one o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
A. W. BARROWS, Secretary,
Office, Room 11, No. 803 California street, San Francisco, California.

WELL SUPPLIES All Kinds, Water, Gas, Oil, Mining, Ditching, Pumping, Wind & Steam Machinery. The American Well Works, Aurora, Ill. 11-15 S. CANAL ST., CHICAGO, ILL. Branch Houses. ELMO STREET, DALLAS, TEXAS.

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The Best, Simplest and Cheapest Coupling for Tank Hoops.
A sufficient lap of hoop renders it unnecessary to rivet the hoop. It will fit the circle of any tank, regardless of size. Made in sizes to fit any width of iron.
Prices, \$1.00 to \$1.50 per Pair. For sale to the trade. Liberal discount in quantities.
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MANUFACTURERS OF MINING AND WATER TANKS.
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Pacific Chemical Works.

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HENRY G. HANKS,
Practical and Industrial Chemist, Assayer and Geologist.
718 MONTGOMERY ST., - SAN FRANCISCO.
Will report on the condition and value of any mining property on the Pacific Coast. Rare Chemicals made to order. Instructions given in Assaying and Practical Chemistry.

DELINQUENT SALE NOTICE.

SAN FRANCISCO MILLING AND MINING COMPANY.
Location of principal place of business, San Francisco, California. Location of work, West Point, Calaveras County, California.
Notice—There are delinquent upon the following described stock, on account of Assessment (No. 1) levied on the 12th day of January, 1892, the several amounts set opposite the names of the respective shareholders, as follows:

No.	No.		
Names.	Cert.	Shares.	Amt.
William W. W. bal.....	1	16 700	\$34 00
Barton, J. Q.....	2	5,000	112 00
Field, A. J.....	4	11,000	224 00
Mitchell, H. K.....	5	50	1 00
Bateman, A. Tr.....	9	300	6 00
Bateman, A. Tr.....	10	300	6 00
Bateman, A. Tr.....	11	300	6 00
Bateman, A. Tr.....	12	100	2 00
Bateman, A. Tr.....	13	500	10 00
Bateman, A. Tr.....	15	50	1 00
Bateman, A. Tr.....	16	250	5 00
Bateman, A. Tr.....	17	250	5 00
Bateman, A. Tr.....	18	250	5 00
Eccleston, R.....	20	500	10 00
Eccleston, R.....	21	100	10 00
Eccleston, R.....	22	500	10 00
Eccleston, R.....	23	500	10 00
Eccleston, R.....	24	500	10 00
Eccleston, R.....	25	500	10 00
Eccleston, R.....	26	500	10 00
Eccleston, R.....	27	500	10 00
Eccleston, R.....	28	500	10 00
Eccleston, R.....	29	500	10 00
Eccleston, R.....	30	500	10 00
Eccleston, R.....	31	500	10 00
Eccleston, R.....	32	500	10 00
Eccleston, R.....	33	500	10 00
Eccleston, R.....	34	400	8 00
Bateman, A.....	35	1,800	36 00

And in accordance with law, and an order of the Board of Directors, made on the 12th day of January, 1892, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 56 Nevada Block, on TUESDAY, the eighth day of March, 1892, at the hour of two o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.
CHAS. H. OSBORN, Secretary,
Office, Room 56, Nevada Block, 809 Montgomery Street, San Francisco, California.

The Explorers' and Assayers' Companion.

A Third Edition of selected portions of the "Explorers', Miners', and Metallurgists' Companion."
A practical exposition of the various departments of Geology, Exploration, Mining, Engineering, Assaying, and Metallurgy.
Price, \$3.00 post-paid. Sold by DEWEY PUBLISHING CO., Publishers, 220 Market St., San Francisco.
By J. S. PHILLIPS, M. E.
The work is divided into four parts—Rocks, Veins, Testing and Assaying. The geological chapters are intended to give miners a practical idea of the various formations. The chapters on mineral veins are derived from long observation, and the section on exploration has been carefully considered. All that relates to discrimination and assay of minerals has been kept as free from formulae as possible. The work is written for practical men, and all the explanations and descriptions are clear and to the point. It is so prepared that it is useful to uneducated men as well as scientists.

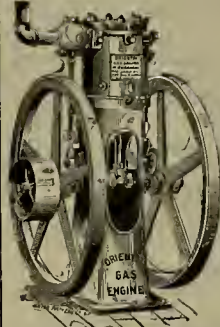
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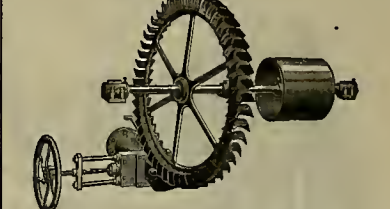


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It can be used for pumping purposes, as well as for all purposes where a perfect engine is required, with the advantage of lessening the risk of explosion. No licensed engineer at a high salary needed to operate it.
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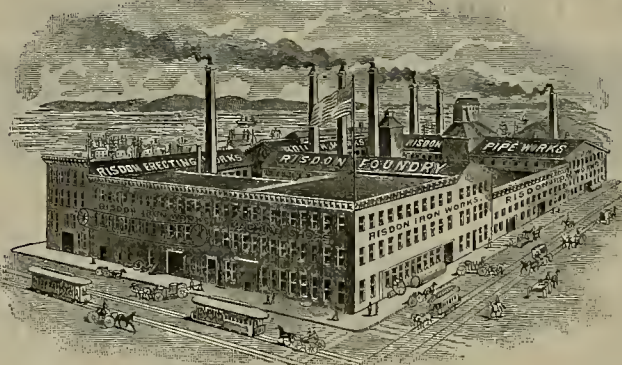
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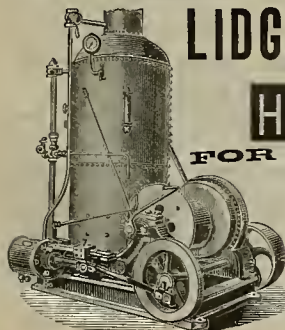
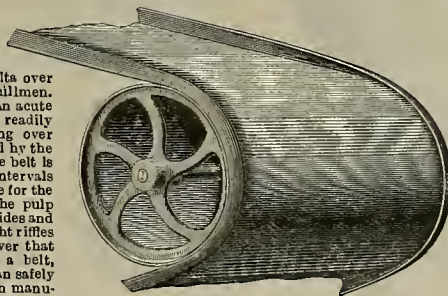
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We have now made arrangements to have our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight rifles also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better belt than has ever been manufactured for use on this coast. It will last much longer and will handle fully one-third more pulp than any smooth belt, and will save a bigger percentage of sulphurets.

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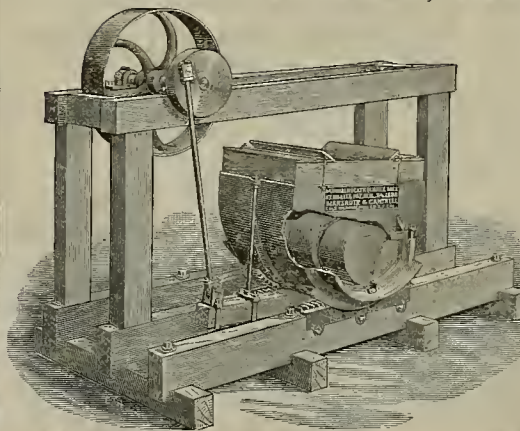
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KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

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The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
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6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or and other ore crushing machines now before the public.

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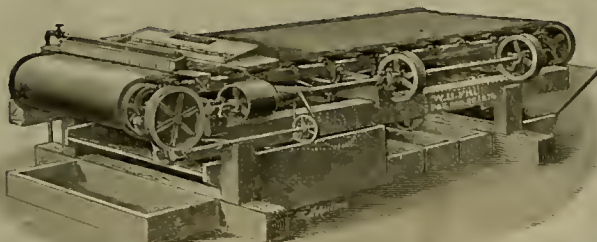
OVER 3000 IN ACTUAL USE.

We are now manufacturing these machines in different styles. The regular Four-Foot Plain Belt Frue Vanner is on the market now in its latest and most improved form, having several improvements on it that facilitate the work, altogether making it a perfect machine.

We are also manufacturing a Four-Foot Frue Vanner with a belt having an improved surface which doubles its capacity. This machine is as perfect in every way as the regular machine, and with its improved belt, it has double the capacity of the ordinary machine. We have sold a large number of these machines, and have demonstrated that they are a success.

The above figures of the number of machines that we have sold tell the tale of their popularity, and show that they have made their reputation by doing their work perfectly.

For any further information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.



Manufactured under Patents of April 27, 1880;

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Price of Plain Belt Frue Vanner, \$575, f. o. b.

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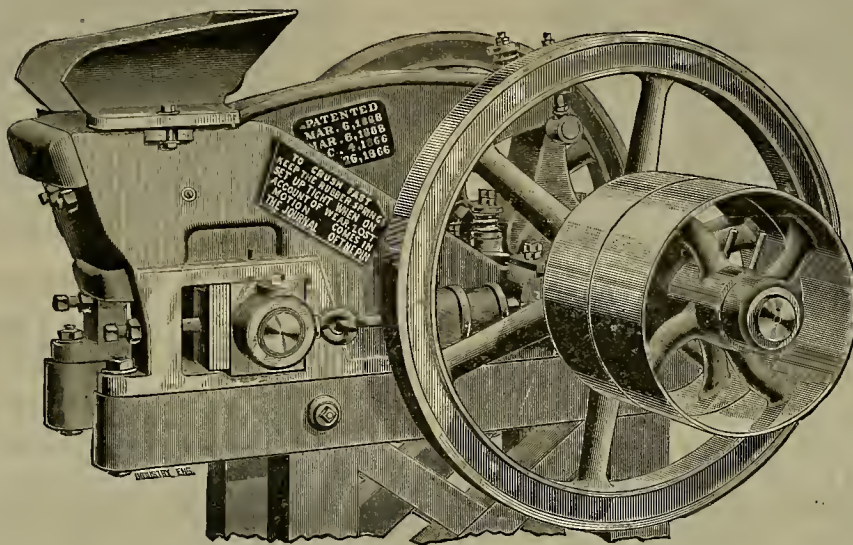
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GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD. OVER 2000 IN ACTUAL USE.

Affords the most simple and reliable power for all mining and manufacturing machinery. Adapted to heads running from 20 up to 2000 or more feet. From 20 to 30 per cent better results guaranteed than can be produced from any other wheel in the country.

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UNLIMITED IN CAPACITY. UNEQUALLED IN EFFICIENCY, UPWARD OF 3,000 NOW IN USE. Will do more than twice the work of any other with the same cost in wear. Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

It having come to the notice of the undersigned that their patent rights are being infringed upon, intending purchasers are hereby warned that all such infringements will be duly prosecuted. (Signed) THE PELTON WATER WHEEL CO.

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In Quartz, Gravel and Placer Mining.

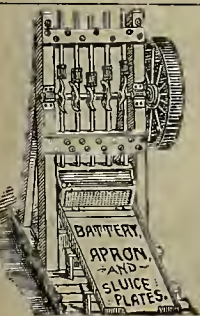
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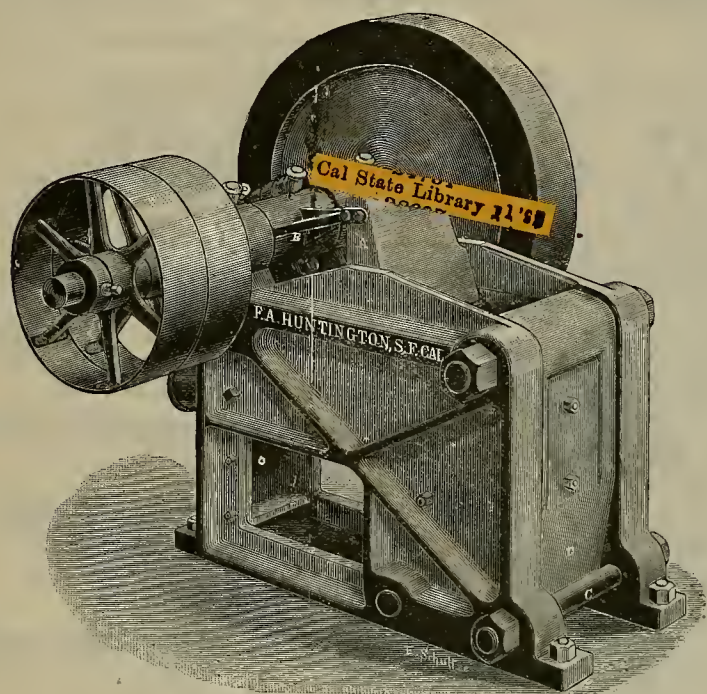


RECEIVED EVERY MEDAL Awarded on the Pacific Coast for Silver-Plated Amalgam Plates and Best Gold, Silver and Nickel Plating.

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— MANUFACTURER AND DEALER IN —

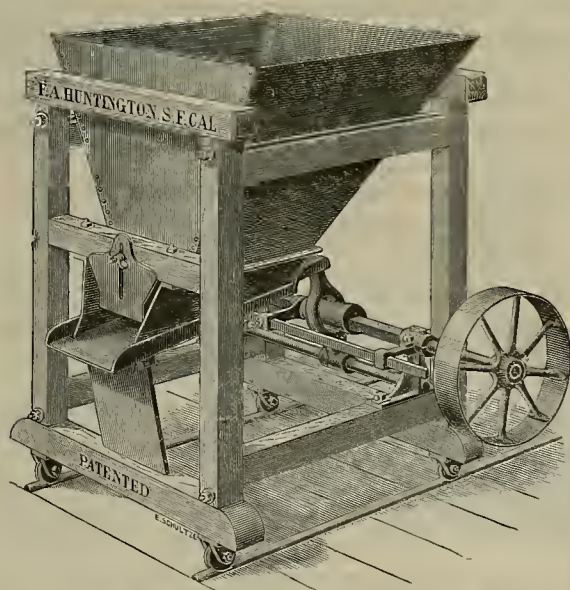
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HUNTINGTON'S IMPROVED ROCK-BREAKER.

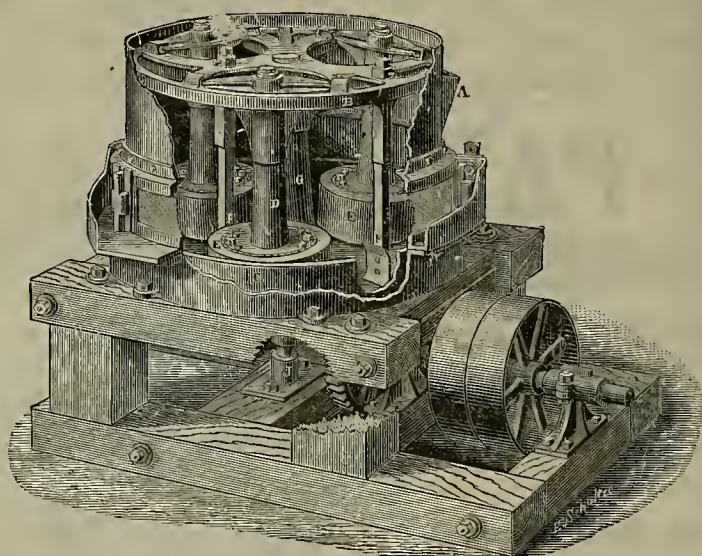
The Main Features of this Machine are Strength, Ease of Adjustment, and Simplicity of Construction.

The movable jaw A is worked by the eccentric B and is pivoted at the bottom. The stationary jaw D is secured at the top by a bolt running through it, and at the bottom hears against the heavy bolt C. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt C and the jaw D. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



HUNTINGTON'S PATENT ORE FEEDER.

This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.

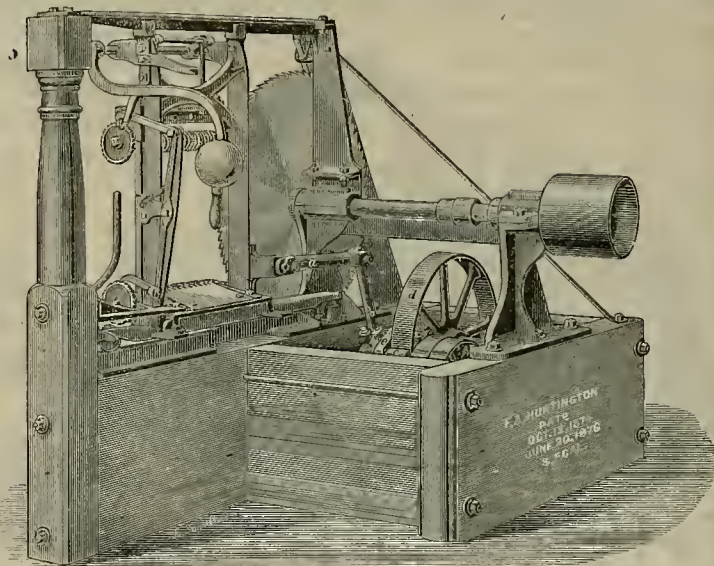
The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet-crushing and gold saving it has no equal.

I CLAIM SPECIAL MERIT IN THAT FEATURE OF THIS SYSTEM WHICH PREVENTS ALL FLOURING OF GOLD AND QUICKSILVER, and the consequent loss of gold that attends stamp-milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.



F. A. HUNTINGTON'S PATENT SHINGLE MACHINE.

This machine is so well and favorably known by all the principal lumbermen on the Pacific Coast that it is useless to go into any detailed account of its merits; suffice it to say that recent improvements in a new, quick return feed works has placed it far ahead of all competitors. Send for Circulars.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL LXIV.—Number 10.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MARCH 5, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

An Industrial Plant.

The Union Forge and Gun Company has been incorporated in this city, for the purpose of manufacturing guns, plates, armor, bars, shot, shell and forgings, or to conduct all business incident to such manufacture. The capital stock is \$2,000,000, of which \$535,000 has been subscribed by the Directors, as follows: Irving M. Scott, H. T. Scott and James O. B. Gunn, \$100,000 each; Henry L. Dodge, Geo. C. Perkins, Millen Griffith, \$50,000 each; J. W. Knowles, \$25,000; L. B. Benchley and C. A. Spreckels, \$20,000 each; James B. Stetson and Charles Holbrook, \$10,000 each.

Although the plans of this company depend to some extent on the project to establish Government gun works at Benicia, still they will be carried out even if the Government plant goes somewhere else. The Government in establishing such plants does not make steel and forgings for the works, but gets them elsewhere. Outside of gun-work, however, armor plates and other steel will be made.

Already the mine where the iron is to come from for making the steel has been bonded. It is intended to use gas fuel entirely, and plans and estimates are now being prepared. A shipload of coal can then be landed at one place, gas be produced from the coal, and this gas used wherever desired in the works.

A plant of this kind will add greatly to the industrial importance of this city and give employment to several thousand men. The names of the projectors give sufficient guarantee that this is not a mere scheme on paper, but one which will be carried out in the near future.

CONFERENCE DELAYED.—The mining delegates from California to Washington were to have had a hearing Wednesday before the Senate Committee on Commerce, but owing to the indisposition of Judge Searles, it has been postponed for a week.

A NUMBER of ladies have taken out membership certificates in the Placer County Miner's Association. The membership of the Association has reached 542.

Mining Exaggerations.

The Colorado people know how to boom their mines and mining camps, and they keep on doing it so persistently that they make many people East believe there is no other place to mine with profit except Colorado. Their papers all have "mining columns," and the whole mining business is well advertised. They put up a Mining Exchange building in Denver a short time ago, and dispatches were sent all over the country calling attention to the fact that it was the only Mining Exchange building in the country. This did not happen to be a fact, however, as there has been one in this

Cons. Virginia. And the latter mine has paid a good many smaller ones since.

The Mollie Gibson is a good little mine and paying very well, but its whole dividend record put together is very little over one month's dividend of either of the two big Nevada mines mentioned. When it gets altogether one quarter of what the Cons. Virginia or California did, it can be called a big mine.

The people who start such paragraphs must be unfamiliar with mining history. There is a tendency to make these exaggerations which only renders their originators ridiculous to those familiar with mining history in this country.

Silver-Lead Smelting Plant.

When carbonates of lead or copper or metallic copper ores contain a sufficient percentage of those metals to smelt without the addition of any other other flux, their treatment in a water jacket smelting furnace is the simplest possible form of smelting, sometimes requiring nothing but fuel and ore. Frequently the percentage of metals is too low to smelt, or the ores may contain copper pyrites and glance and galena.

In preparing the last-named ores for the furnace, miners are met with the complex side of the smelting process; mixtures of

iron ore, limestone or silica are found necessary, and to determine when they are required, and how much of each must be added to the ores, is the problem that must be solved to work these ores successfully.

It often happens that ores of a different character are at hand, which flux each other to a great extent, in which case they are mixed together as required and then the necessary flux added.

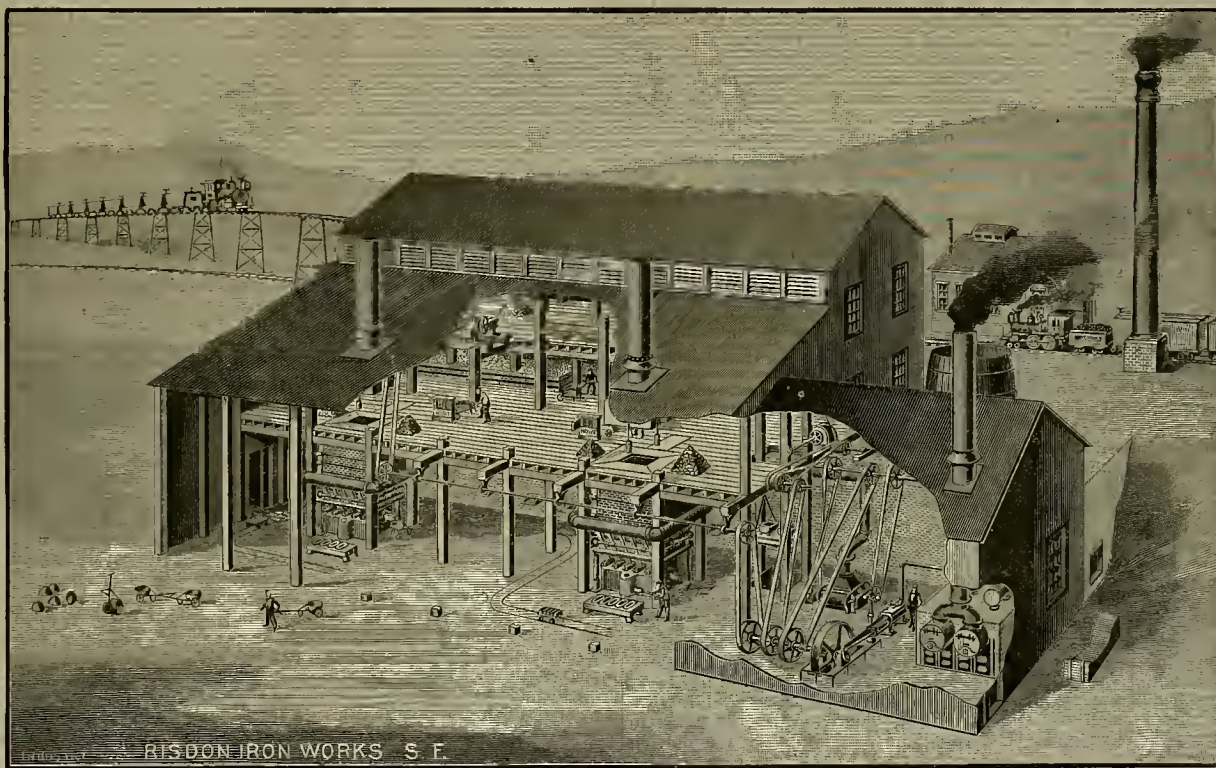
The accompanying plate is an isometrical view of a galena silver smelting plant, equipped with Baker blowers, improved Corliss engine and boiler and sectional

water jacket smelters of large capacity. This may properly be termed a modern smelting plant, and embodies all the latest improvements, as arranged by the Risdon Iron and Locomotive Works of this city.

LARGE assays from ten-foot "shafts" continue to be reported from Oreede, Colo., but no producers that amount to much are yet in operation. A good many men are going to the camp, and a good many are already there.

EL DORADO COUNTY now has a County Miners' Association. J. J. Crawford is President; Thos. Fraser, Vice-President, and G. A. Richardson, Secretary. This is a branch of the California Miners' Association.

OREGON and Washington Senators are making a strong fight to get the Government gun plant put up on Puget Sound or the Columbia instead of at Benicia, in this State.



A MODERN SILVER-LEAD SMELTING PLANT.

city for 20 years or so, and which cost some \$750,000.

And now comes another Colorado wonder, in the form of a mine, which, in ten months, has paid dividends amounting in the aggregate to \$1,200,000. It began last April, and last month paid \$300,000. In March it is expected to pay \$400,000. The dispatches claim, as the Colorado papers doubtless state, that this latter amount is the largest sum ever paid in dividends in one month by any silver mine in the world.

It happens however, that the Consolidated Virginia mine of Nevada paid 34 monthly dividends of \$1,080,000 each, and the California 26 monthly dividends of \$1,080,000 each, between 1875 and 1878. The Belcher and Crown Point dividends of 1873 and 1874 varied from \$200,000 to \$1,000,000 each per month. These are all Comstock mines, in Nevada. The Mollie Gibsons single \$400,000 dividend does not come half way up to a single one of the 34 dividends of the

It was only a few years ago that a gold bar worth about \$100,000 was made in Helena, Montana, and shipped for exhibition to Minneapolis as the largest gold bar ever made. It was from the product of three mines. The MINING AND SCIENTIFIC PRESS at that time called attention to the fact that a bar worth \$114,000, or \$14,000 more than the Montana one, had been exhibited in this city in 1882, and was made from one run of the North Bloomfield hydraulic mine. Still, the Montana bar went off for exhibition, but went under false pretenses.

Both California and Nevada have done some few things in mining which the newer regions have yet to accomplish. California has passed the billion mark in bullion product, having turned out in gold alone \$1,260,000,000. Nevada has a dividend record from its Comstock producers which has not yet been equaled by any other camp in the country.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—ED.

The Gold Fields of Idaho.

A Placer Mining Boom in Lemhi County.

SALMON CITY, IDAHO, FEB. 16, 1892.

TO THE EDITOR:—Judging from the substantial developments at the present time being prosecuted, and the numerous schemes now under way and projected for the early spring, it does not require a very deep mental effort to foretell the coming of very very lively times among the placer mining interests of this portion of Idaho in the near future; and it looks now as if the prophecies and reports which the writer has occasionally made, through the columns of the PRESS, regarding its wonderful mineral resources, were in a fair way to be thoroughly investigated and verified.

The principal company at the present time in active operation, and whose wonderful discoveries have created so much interest in the placer mining business, is known as

THE LEMHI PLACER GOLD-MINING CO.
(LIMITED).

This company was organized last fall, in Denver, under the State laws of Colorado, capitalized for one million shares at a par value of five dollars each. The company is largely composed of prominent mining men of Denver, Colorado Springs, Leadville and Aspen.

The property is ably superintended by Mr. W. S. Patterson, formerly of Denver, who introduced it to the present owners, and it is situated about six miles northeast of Salmon City, on Kirtley creek, a small tributary of the Lemhi river. The company commenced by purchasing what was known as the Compton and Dougherty old channel diggings, comprising a claim of 120 acres, for \$20,000, which was paid over last October. To this they have since added, by purchase and location, sufficient territory to make a block of claims comprising about 4650 acres, which stretches back over the higher gravel hills and benches to the north of Kirtley creek, covering the possible line of any other ancient channel, which present developments strongly indicate may exist.

The company has had a force of men sinking prospect holes on each claim, and it is estimated that the whole block will average about 30 cents per cubic yard, with hardly any waste ground. The solid foundation bedrock has never been reached yet. They come down on to strata of cement-gravel and hardened silt, each of which is gold bearing; and judging from the lay of the land, they will probably have a bank of material two or three hundred feet deep in places, that will pay to wash. Their best pay is found in a bed of greyish colored gravel, about 20 feet thick, situated at the head of the narrow cut, in a shallow draw that puts into the main creek where Messrs. Compton and Dougherty first made their discovery. The course of this bed of gravel runs across the course of the draw, and about parallel with the main creek, and dips at a slight inclination back into the hill. It is quite extensive; has been traced a long distance; and, on numerous tests so far made, gives an average yield of over five dollars per cubic yard, in coarse gold, mostly on the flat order, from the size of flax seed up to that of a watermelon seed, and there have been heavier pieces found.

This same kind of gravel shows up at different points on the company's ground for nearly a mile back from the outcrop of this bed, and over 700 feet higher in altitude, where it is equally rich. And it is amusing to hear some of the old timers, at present in the employ of the company, describe the great ignorance they displayed in delving along the course of the main creek, only making \$2 or \$3 per day, when there was dirt on the adjacent hills that they could have hauled to water and rocked out an ounce per day to the man.

The writer gave a description of these diggings in a letter to the PRESS in January, 1891, when they were finding coarse gold right in the black loam. I suggested then that there must be an ancient channel near by that produced it, as it certainly could not have come very far and remained so near the surface, and there were various theories advanced regarding its origin; for at that time they had only found it in one of the shallow draws, on the side of the main creek. It was thought by a good many to have been derived from an ancient river channel, which is well defined in places, running parallel with, and close up to, the main range; and it may have been one source of the gold. But recent developments indicate that a good deal of it came from the numerous gold-bearing veins and reefs that cross the spurs and deep gulches putting down

from the main range, near at hand. There is a claim called the "Shylock," located on one of these veins, about one mile above these placers, the cropping of which has produced ore specimens, with heavy pieces of native gold attached to them, one piece of which weighed as much as 40 cents, and I have examined some flat nuggets taken from the placers below, that showed a dim outline of the same dendritic markings as on the quartz gold.

This vein can be traced across the canyons, with formation and ore to match on both sides, and has been eroded out 1000 feet deep in places, while the gravel foothills below are strewn with the same kind of iron and copper-stained quartz, wash and float that the veins carry. The pay in these placers will probably be found in a succession of benches or terraces, representing the ancient and more direct courses of these streams, for it is a notable fact that of five creeks putting into the Lemhi river from the main range, each carries a big hydraulic prospect. The bars occur on their northwesterly side in each case, and the present creek channels turn at a sharp angle to the southeast, up stream on the Lemhi, after leaving the rocky canyons and entering the foothill formation, indicating that their courses were at one time more direct from the canyons, which point generally in a southwesterly direction.

This company has left a contract to Messrs. Parsons and Winters, the noted railroad builders of Butte, Montana, for the construction of a ditch to be ten feet wide on the bottom and three feet deep, to convey the waters of Carman Creek over to their diggings, the several branches of which, collectively, can supply from three to ten thousand inches during three months of the year.

This ditch line is twelve miles long altogether, one-third of which distance will have to be flumed. The first section of five miles, covering the two first forks, is to be completed by the last of May. It comes around over a low divide that separates the two creeks, and covers most of the company's high ground; the end of the ditch line being fully 1000 feet in altitude above their low bar. The company has also secured a water right of 20,000 inches out of the Lemhi river, the taking out of which is at the present time under consideration. This, together with ample dumping facilities, secures all the requisites for an extensive hydraulic mining operation. The contractors have been busy all winter. They have 40 men and 16 teams at work, and are rushing the business right through, while the company have got in a sawmill of their own which has a capacity of 25,000 feet per day, and it is kept busy at the present time making lumber from logs obtained in the adjacent gulches. They estimate it will require over 2,000,000 feet for their flume construction and other work.

Their operations give employment to about 100 men at the present time, and as their camps are situated within a few miles of Salmon City, with goods roads to get around on, these operations give a healthy impetus to the general business interests here, and reflect much credit on the judgment and foresight of their genial superintendent, Mr. W. S. Patterson, who set the enterprise in motion. We are also fortunate in getting Colorado capitalists interested in our mines, for their nifty and successful ventures in mining matters in their own precious soil, and elsewhere, continue to challenge the admiration of the delving world; and I believe it is the earnest wish of this community that their dividends may roll in from this venture when they get it in full working order, proportionate to the magnitude of the enterprise.

THE BOHANNON BAR,

The principle portion of which was recently bonded to Mr. Wm. G. Shedd, of Denver, is probably one of the safest gold mining investments, if intelligently handled, that ever was offered to the investing public, if gold is in the ground and the natural facilities for getting it out can make it such. This property was fully described in my last letter to the PRESS of June 13th, 1891. It is situated on Bohannon Creek, about five miles across the hills from Kirtley Creek, on the same side of the Lemhi, and constitutes an even stretch of low bar ground, with good grade, about six miles long by nearly half a mile wide to the base of the adjacent hills, which are largely gravel banks, corresponding to the high bars on Kirtley Creek. Bohannon Bar has been worked for over 20 years in a small way, with the creek water in the spring season, and by drifting and rocking; and is quite extensively opened at different points by shafts, drifts and pits worked out. One of these pits, comprising something over 35 acres all in one block, and situated at the lower end of the bar farthest away

from the mountains, paid on an average over \$5000 per acre. The whole bar is said to have produced over \$600,000, all told, and it is estimated that there is still 1500 acres in the low bar alone that will pay at least at the same rate. The gravel is from 12 to 20 feet deep, with very few large boulders; and the gold is on the thick plate order all through it, with small nuggets on bed rock, which is a soft sedimentary formation and easily cleaned. It of course requires water from the Lemhi river to make this a large paying proposition for a big company; and it will cost considerable money to bring it in. But such cost will be a mere *bagatelle* compared to the amount of gold contained in the ground, with an unlimited supply of water and two pairs of heavy monitors working both ways to bed rock flumes against a double breast along the course of the bar. They could sweep off an acre of this gravel in short order. Mr. Shedd took the hint from the Lemhi Co. and secured a large tract of the high bench land on the northwesterly side this bar, which track covers all old channel possibilities here, and secures excellent dumping ground in two or three directions. He has a crew of men at work at the present time prospecting the high ground, and they are meeting with very flattering results. They have discovered a bed of fine-looking gravel, with a sediment rock capping, that bears the same relative position to the lower bar, as the rich channel does on Kirtley Creek; and carries a fair prospect to start with. They will run a drift across it, and feel very sanguine of striking an equally rich course. Mr. Shedd has also secured two other valuable groups of claims, on Sandy and Carman creeks, and is in Colorado at the present time interesting strong parties in all of the territory located and controlled by him.

Across the range, 15 miles west of Salmon City in the

LEESBURGH BASIN.

There is a very bright prospect of that old camp taking on a new lease of life and renewing its golden fame.

At this place Mr. John L. Armit, of Colorado Springs, has tied up for an English company, some large tracts of valuable placer ground, with water privileges, including a long stretch of virgin territory on the main Napiers creek, owned by Messrs. Tingley and Barracks of Salmon City. Also the "Bull of the Woods" property at the lower end of the basin, a detailed description of which was given in my last letter to the PRESS. Mr. Armit has had surveyors and experts on the ground getting matters in shape, and making practical tests of cubic yard samples. It is reported that they have a long stretch of ground on the main creek, above the old town, that runs \$12 per cubic yard for several feet above bedrock, which, by concentrating the water interests at this point, can readily be made to yield handsome returns.

It has been the opinion for years of old timers who have worked in these diggings, that if the "Bull of the Woods" should ever fall into the hands of a company able to drain the ground, it would make one of the best-paying institutions in the country. This property covers about three miles of the main Napiers creek, from the falls up. The ground lies very flat, and will require a bedrock tunnel probably 300 or 400 feet long to drain it. This is the reason it has never been worked before. Where bedrock was first struck up this stream above the head of the falls, it paid half an ounce a day to the hand, in ground sluicing, and from that point up, this creek and its short tributaries and bars, embraced within an area about seven miles long by three miles wide, has produced since 1866, \$10,000,000 worth of gold dust. The rock to be driven to drain this property, is soft granite and conglomerate that ought to work easily. When this drain tunnel is put in, they will have the advantage of a dump that falls away about 2000 feet in two miles, and an abundant water supply that lasts all through the season, already on the ground.

THE PANTHER CREEK

And Prairie Basin placers, situated about 25 miles southwest of Leesburgh, are attracting considerable attention at the present time with some New York and Chicago parties. A company which has been organized, has a large tract of ground carrying a big hydraulic prospect through the gravel, and coarse gold on bedrock, with a large stream of water and other natural facilities on the lower creek. Farther up in their Prairie Basin and Silver creek ground, the gold is on the scaley order, and low in grade, being nearly half silver, and according to old timers who have tried to work it, hard to save. This assertion is borne out by some of their old tailings, piles which pan nearly as well as the bank, and give a prospect that would pay at the rate

of an ounce a day to the man if the gold was as easily saved as that from most any other part of the county, hardly any of which runs less than \$18 per ounce. But Mr. N. L. Turner, the leading spirit of this enterprise, who is a Snake river miner and an expert on fine gold saving devices, claims he can save every color of it without difficulty. The bedrock in this basin is mostly porphyry, and there have been threads of ore found in it that showed beautiful specimens of native gold and wire silver.

YELLOW JACKET CREEK

Is a tributary of the middle fork of the Salmon river, which heads up against Prairie Basin. There was a report came over from there last fall that some prospectors had found a pay channel in a flat below the Yellow Jacket quartz mine, that yields on an average four cents to the pan near bedrock. This creek was the scene of a stampede in early days from Loon Creek, when 600 men rushed over in one day on the report of rich diggings having been struck, but they did not pan out to suit the ideas of miners of that period, when wages were six dollars per day. But four cents to the pan will probably prove a profitable prospect under present methods of placer mining. The Yellow Jacket quartz mine is probably one of the biggest free gold quartz propositions in the West. The vein is from 40 to 60 feet thick in a contact between granite and quartzite, and can be traced through the entire length of seven full claims; and the mountain is thickly strewn with quartz, in places for 600 feet in width. The company owns 14 claims, four of which are patented. The connected developments amount to 2000 feet in length on the vein, and 300 feet in depth; and the vein can be tapped at 1000 feet in depth by an adit tunnel. It is equipped with a perfect ten-stamp, free-gold mill, which has been running steadily now for nearly four years, crushing quartz just as it comes out of the mine, without sorting, that pays on an average ten dollars per ton; and carries five per cent of concentrates that assay \$250 per ton. The mill is run by water power. The company has saved its tailings, and will put in a concentrating plant next season to work them. It also has immense reserves of ore in sight, and is contemplating the erection of another mill with 50 stamps. This property was one of the early ventures of Mr. J. B. Haggin that did not pay (owing purely to mismanagement) and laid idle a long time, until it was purchased by Messrs. Morrison, Stein & Co. of Bonanza. Mr. Stein, who personally superintends the operation of the property, is a thoroughly practical miner and millman, and under his *regime* it has been transformed from a dismal failure to one of the most profitable and promising gold mining operations in the State. This mine is situated at a distance of 120 miles from a railroad, the nearest point being Red Rock, Montana. There is a report of some recent discoveries near the Yellow Jacket, in silver lead and free gold ores, that are too big to tell about without a personal investigation.

There was a packtrain load of ore shipped from the Perkins mine in that district last fall that ran 200 ounces in silver and 40 per cent lead.

THE RAILROAD PROJECT,

Which seems most likely to relieve the pressing needs of this section of country for cheaper transportation, is known as the Butte and Boise Short Line, and there is a very bright prospect that it will be built. The preliminary surveys for this line were made last summer by Mr. O. L. Miller of Boise, and a corps of engineers. The route was found to be quite feasible, in fact much more so than was at first anticipated. From the time it leaves Boise till it reaches Butte, it passes through and near by one continuous string of mining camps that would be capable of furnishing an immense traffic. The lumber, grazing and agricultural resources of the route are also very extensive; and if it is built, the trunk line it transfers to at Butte, will acquire one of the richest feeders in the northwest.

THE GIANT GROUP

Of placer claims, situated on the gravel foothills on the west side of Salmon river, six miles below the mouth of the Lemhi, was discovered last fall, and is one of those strikes that call forth the stereotyped expression, "Who would have thought it possible that anybody would ever find pay in such a place as that?" because it is situated near regularly traveled roads and trails, like miles of other territory fringing the Salmon and Lemhi rivers, which, to all outside appearances, ought to carry pay just the same. The foothills where this property is located, are comparatively steep. The ground is not fabulously rich, so far as tested, but gives great promise of big development. The gravel is quite shallow down at the lower end of the

claims near the river, but the water has cut down in places farther up on the hills, and exposed much deeper channels. The gold is coarse and almost as round as shot, and seems to be scattered all over the ground, both ridges and gullies alike. They made some test runs last fall, having not to exceed 40 miners' inches of water to work with, and it paid at the rate of \$3 per day to the man for the work done; and among the gold thus produced were two smoothly-worn nuggets that weighed \$5 and \$3.50, respectively. The owners were so well satisfied with these results that they at once commenced the construction of a ditch from a creek near by which is now nearly completed, and will give them a thousand inches of water. They have got all the necessary appliances for hydraulic operations on the ground, and will work the gravel very rapidly when the season opens. This property comprises about 500 acres, and is owned by Messrs. White-well and Cummings of Salmon City. Mr. Cummings also owns a group of patented free-gold quartz mines in these same foothills, a little above the placers in altitude. The veins are from two to five feet thick in a soft talc slate, above granite, and are developed to a depth of about 150 feet; and by a working test, yielded at the rate of \$20 per ton. Besides the enterprises already mentioned there are

NUMEROUS OTHERS

That give great promise of future values, prominent among which are the mines of the North Fork, the Carman and Freeman creek bar claims, the Salmon River group, situated between Carman and Kirtley creeks, the Three-Mile group, the Geertson creek property, between Kirtley and Bohannon creeks, the Sandy creek and Pratt creek bars, and others, comprising tracts of from 160 to 3000 acres, each of which has been proven, either by prospect holes or actual working tests, to contain rich ground for hydraulic operations. Nearly all of these claims come under the altitude of the upper reaches of the Lemhi river and its larger tributaries. There has been about 40,000 inches located on these streams by thoroughly responsible parties, and it is probable that there will be a "water company" formed in the near future, to bring out a big ditch to cover a good deal of this ground. It is a good country to construct a ditch in; excepting a few deep gulches to cross. There is also some ground where the altitude does not exceed three or four hundred feet above the river, which might be supplied with a thousand or fifteen hundred inches, through an inverted syphon pipe. The river has an average grade of 50 feet to the mile.

It will be seen from the foregoing that we have a "sure enough" mining boom; and if half the schemes that are at present germinating should assume the shape of working organizations, it will be a "hummer" by next fall; and should the principal companies now in the field confine themselves to a legitimate and conservative policy, their operations will result in the development of a mining region that will make "all the world wonder" how it could have remained so long undeveloped. The gold fields of this portion of Idaho are very extensive; there are thousands of acres of placer ground that will pay from 10 to 50 cents per cubic yard, and which, under the lubricating influence of capital and enterprise, can be made to add a million or two dollars worth of gold to the annual output for a long series of years to come, and after the railroad gets here—for it cannot much longer resist the metallic attraction of this country—that amount will be doubled up several times over in baser bullion. As it is interesting and indicative to many mining men to know what a given section of country has done for itself, it might not be out of place here to state that there is already recorded to the credit of this section of Idaho, embraced within the original limits of Lemhi county, a placer gold production of fourteen million dollars; a single quartz property that has produced five millions of dollars, half of which was clear profit, and the mine—the General Custer—is still producing; a single silver mine that has produced about three millions, and is still producing at a depth of over 1000 feet—the Ramshorn; two of the richest specimen mines in the world—the Montana and the Charles Dickens; a lead mine—the Viola—that produced three million dollars worth of bullion, at a profit of 30 per cent; and one of the deepest free gold mines in the State—the Kentucky,—800 feet down on the vein. These are a few samples of the successful mining operations of this section, which ought to create a favorable impression, considering that they are all situated in a rough, mountainous country, at distances ranging from 60 to 150 miles from a railroad. Of course, we have the usual leavening of failures, many of which might have been averted

if they had fallen into the hands of capable and honest operators. There is a large extent of territory in the central portion of Idaho, accessible by this route, that is worthy the attention of mining men in every branch of the fascinating business, from that of the prospector to that of the capitalist; and we hope to see the stage road from Red Rock, Montana, kept warm the coming summer with the wheels of their conveyances.

R. B.

El Dorado County Slate Quarries.

ALAMEDA, Feb. 27, 1892.

TO THE EDITOR:—The frequent mention of the El Dorado county slate quarries, in the columns of the MINING AND SCIENTIFIC PRESS, has done much to attract attention to this industry, and it is now probable that a thorough development will shortly ensue.

"Mineral Resources of the United States" (Government printing office, 1890) contains a suggestive paragraph, page 548, which I think deserves notice:

"The exports of roofing slate from New York show a very large gain, as indicated by the following tables: The increase in the amount exported to British Australia is particularly noticeable, the figure for 1887 being 2,203,551 pieces, while for 1888 it is 4,125,858. This favorable competition with England in one of her own provinces must be very gratifying to American producers, as it probably means an advantage in quality as well as in price."

Since these statistics were published, the amount of slate shipped from New York to Australia has rapidly increased, England and New York now being about equal competitors; and were the Californian quarries properly developed, I am satisfied that they could compete successfully in that market.

In quality, this slate is inferior to none, its elasticity, toughness, cleavage and permanency of color leaving nothing to be desired. This statement can be readily verified. The present workings are less than three miles from the Placerville railroad station, on the county road from Placerville to Georgetown, and upon one of the finest water powers in the State. The strata are here almost vertical, rising from the river at an angle of about 60° to a height of 600 feet. Very little waste material has to be handled, the debris forming a broad platform on the river bank.

By utilizing a portion of the water power at hand, the slate might readily be placed on board cars at Placerville (by wire rope-way or otherwise) at a trifling cost, if handled in large quantity. The natural facilities for quarrying and the inexhaustible supply must be seen to be appreciated.

I have visited several of the larger quarries in Pennsylvania and Vermont, but in none have I seen slate of such width so readily accessible, Eastern quarrymen being often compelled to work considerably below the surface, necessitating the use of expensive hoists and pumps.

The freightage from Placerville to San Francisco is at present about \$3 per ton (carload lots). This rate cannot be raised, but on the other hand, the railroad company has frequently expressed a willingness to lower it, should shipments increase. The freightage on this class of freight from San Francisco to Australia is always much less than from England or New York to Australia, there being usually a difference of more than the entire cost of transportation from Placerville to San Francisco; therefore I am of the opinion that these slate beds will ultimately supply a portion of the Australian demand, as well as a largely increased amount on the Pacific Coast.

The present condition of the industry in this State is encouraging. Although not advertised or pushed in the least, the demand, at a high price, is much larger than the supply. I am informed that orders aggregating \$18,000 have lately been refused.

Slate has now many uses. As a roofing material, it has great advantages over shingles, tin, iron or tiling, but until recently was seldom recommended by Californian architects on account of cost, transportation rates from Eastern quarries and a high percentage of breakage in transit making the price almost prohibitory. In a mild climate, such as that of California or Australia, it loses its one disadvantage—that of liability to become loosened by repeated heavy frosts—and when once properly laid, practically lasts forever.

These slate beds are so situated as to permit of control by a single company, and had the industry been better understood and appreciated on this coast, they would not have so long lacked capital for development.

By avoiding the various mistakes caused by bad management and inadequate means, there is here an opportunity to build one of the largest and most profitable industries on the Pacific Coast.

M. INNES.

The Two Conventions.

EN ROUTE FROM DENVER, COLO., }
Feb. 19, 1892. }

TO THE EDITOR:—Your criticisms on my article, "The Two Conventions," were duly noted, and but for want of time would have been earlier answered. I will now say this: The land resolution was a very weak affair, and anything else than that was contemplated. and was placed before the Committee of Resolutions, and hence I say ruled out. The quartz-mining interest, as regards mineral claims on railroad grants, had not the least consideration, and, all things considered, it looked as if the railroad interest fared well.

Now, as to the silver question, when I say it was ruled out I know also what I am saying, as I sent in a resolution on the subject. You say there was none properly presented. To be sure, I might have presented one to the convention independent of the Committee on Resolutions, but expecting it to come from other quarters, I did not desire to be too officious. As a convention in the interest of hydraulic mining, it was a well laid out success, and I am glad of it, as hydraulic mining has no better friend than I am; but when it comes to a "Miners" Convention, its scope was altogether too limited, all things considered.

These criticisms are not to be considered as against what was done by the convention, only on what was not and should have been. Speaking of the silver question, it is the liveliest one to-day in every other State but California, and why it is not there is simply because California mining interests seem dead in comparison to what you find elsewhere. In Utah and Colorado, notwithstanding the great discount on silver, and, we may say, their labors, all is life and progress in comparison to California. In my conversations with travelers as I meet them, they seldom talk of California as a mining section good for capital or labor; it is all the time Colorado, Utah or Montana. And why? These sections have their mining interests cared for by the daily press. Take the Salt Lake or Denver papers, to say nothing of the press in the special mining sections, and you will find from one to three columns daily in reference to their mining interests. Not so in California. If the leading city press give a column, or part of one, once a week, they think this does well for the interest.

ANOTHER PROCESS.

But California's mining interest will soon be awakened by the incoming of the new process for the extraction of gold—the MacArthur-Forrest (cyanide) Process. This process is one of the wonders of the age. It reverses the order of gold extraction, making that which has been the most difficult to get by our usual process the easiest. This process is not only efficient in extracting a high percentage of gold and silver, but it is capable of being carried to an unlimited extent. In South Africa they are building mills for treating 8000 tons of ore a month, and several are being erected in California for working 100 tons a day. I have studied this process now for nearly a year and have made any number of tests on a large as well as smaller scale, and were I to give the results, it would wake California mining interests up. I visited one mill in Utah working 30 tons a day, also several in Colorado. Mills are going up in Montana and Idaho. The fact is, the process is going to override every other mode—lixivation, chlorination, concentration, dry amalgamation. Silver plate stamp mills and pan mills for silver ores will all in time yield to the merits of this new Scotch process.

All California miners know I have asserted over and over again that our Californian mills were not extracting on the average 50 cents on the dollar of their ore's value. The cyanide process will prove it so, and, furthermore, it will get 40 cents of the lost 50 for them on practical working. I say this much about the process in the interest of Californian miners.

I neglected to say that I had as traveling companions over, Judge Searls, Mr. Hobson and others, the committee en route for Washington for persuading an appropriation for dams, etc., in the interest of hydraulic mining. No better committee could have been selected. Their entertaining and personal qualities are great. In Denver I met Wm. M. Lent, so well and favorably known by all old Comstockers. Mr. Lent retains his enterprising and vigorous spirit, and his friends will be pleased to know that he is well, looks well, and full of "snap."

At present there is great excitement in Colorado over the very extensive gold and silver finds in Creed and Cripple creeks. People and capital are flocking in heavily from the east, west and Colorado. A very

large amount of capital is going in. The fact is, Colorado and Denver are all alive.
ALMARIN B. PAUL.

The Granite Mountain Report.

According to the report of the Directors of the Granite Mountain Mining Company for the year ending July 31, 1891, the balance in the hands of the treasurer at the beginning of the year was \$1,208.44. There were shipped during the year 2299 bars of bullion, containing 3,200,608 ounces of silver and 6468 ounces of gold, which sold for \$3,463,815.65, and yielding, after paying express charges, refining charges and commissions, \$3,380,226.54. There were also shipped 17.7 tons of furnace slag, containing 9425 ounces of silver and 19.64 ounces of gold, which sold for \$9,309.12. In addition, \$57,998.76 was received from the Montana department, making the total receipts \$3,448,742.86. The disbursements were as follows: Montana department for pay-rolls, supply bills, \$182,870.11; insurance, \$9870; salaries, office rent and sundry expenses, \$22,049.55; dividends, Nos. 68 to 79 inclusive, \$1,900,000; cash balance July 31, 1891, \$15,836.24.

COST OF MINING.

During the year 85,471 tons of ore were mined and delivered to the mills, at an average cost of \$5.734 per ton, divided as follows: Labor and superintendence, \$4.196; hoisting and pumping, \$0.786; timbers, \$0.323; powder, fuse, caps and candles, \$0.222; tools, \$0.111; miscellaneous, \$0.123.

In driving levels and drifts, the average cost (including timbering) per lineal foot was \$12.67; crosscuts, \$17.17; winzes and raises, \$16.61; sinking Ruby shaft, \$73.99; sinking Cleveland shaft, \$53.95; driving Rumsey tunnel, \$28.14. The cost of prospecting has increased slightly owing to increased depth of working.

COST OF MILLING.

The three mills crushed 72,622 tons (wet) of ore, or 68,850 tons (dry), and 10,807 tons (wet) of salt, or 10,645 tons (dry). The average moisture in the ore was 51.2 per cent. The salt and ore was mixed before crushing. The ore averaged 50.59 ounces of silver per ton, and the actual per cent saved was 90.7. The cost of milling was \$10 per ton (dry), divided as follows: Labor and superintendence, \$3.460; salt, \$1.988; fuel, \$1.644; quicksilver, \$1.123; castings, \$0.632; chemicals, \$0.289; water, \$0.136; miscellaneous, \$0.726.

A COMPROMISE.—An event transpired this week that goes a long way toward proving just how thoroughly disgusted some of the Park's claim holders are with mining litigation, and also sounds the keynote to a wise and judicious course in the future where conflicts exist between claim owners. First, the Park City Mining Co. and the Silver King people got together, talked over their differences and claims to ground in dispute, and finally came to an amicable understanding and settled the matter in a manner satisfactory to all concerned. Second, the owners of the Lief Erickson and Volunteer claims, which were also in conflict, held a consultation and decided to compromise their trouble and did so on the spot, all parties interested being perfectly satisfied. These two compromises take four suits at law out of the Third District Court, and will be the means of saving all parties many dollars for developments that would otherwise have gone to the lawyers. It was a wise move and a cheap one.—Park City (Utah) Record.

CAUSE OF THE CLOSING DOWN.—Rocky Bar (Idaho) Bulletin: We are informed by some of the Custer county boys who reside in the Cœur d'Alene mining region that the mines up there are liable to remain closed down for four months, and that 3000 miners are thrown out of employment by this operation, and they are leaving for Butte and Colorado as fast as possible. The main cause of the shutting down was the railroads. They would not grant the mine-owners a \$2 reduction per ton on shipments of ore and concentrates. The mines of that district, as a rule, produce low-grade ores, and in consequence cannot stand high shipping tariffs.

STANFORD UNIVERSITY PROFESSORS.—Advices from Madison, Wis., are as follows: C. B. Wing, Professor of Railway Engineering in Wisconsin University, has accepted a call to the Leland Stanford University. A. W. Smith, Professor of Machine Design, and L. M. Haskins, Professor of Pure and Applied Mechanics, have calls from the same institution under consideration. It is feared that they, also, will go. All are rarely good men. Both Smith and Wing came to Wisconsin from Cornell only last fall. Haskins is a local graduate.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

WILDMAN.—About 18 men were laid off at the Wildman mine last week. The reason for this action, as far as we can find out, is that the ore on the lower level does not come up to the paying standard. Sinking is to be resumed, in the hope that better prospects may be met with.

THE CLINTON CONSOLIDATED is said to continue to look well. The high grade rock is reported to be eight or nine feet wide. A very large stock of all kinds of goods has been received at the store, also liquors for the saloon.

THE PLYMOUTH CON. started to work last week to pump the water out of the mine. There is 500 feet of water in the shaft, with the drifts below that, all full of water. To get out this immense body will take at least from one to two months steady pumping. This action of the company looks more like old-time scale of working than anything that has taken place since the fire over four years ago. At the Bellwether or Bright claim, they are making an upraise from the tunnel to the surface, a distance of 50 feet. This is preparatory to sinking a shaft alongside the ledge. The ore continues to look remarkably well. J. B. Francis, superintendent of the Clinton Consolidated, visited the property this week, and was surprised at the excellent showing. Samples of ore taken by him were assayed at Wieland, and yielded \$28 per ton. It is said to be the finest prospect, considering the depth, that has been found in the county for years.

Calaveras.

RICH STRIKE.—Calaveras Chronicle, Feb. 27: We have been informed that a rich strike has been made in the mine owned by the Shepherd Bros. and Byron Swank. The mine is situated east of Wiggins' sawmill, and about eight miles from San Andreas, and has only been in operation but a short time. A shaft has been sunk to the depth of 50 feet, and the bedrock has now been reached. Blue cement-gravel was encountered in the shaft at a depth of five feet, which good judges say will average \$5 to the carload, and the gravel is now 45 feet in thickness. The owners intend erecting water power hoisting works, and also put up a first-class stamp mill so as to work the mine on an extensive scale. It is without a doubt the richest strike that has been made in the county for years, and all the conditions are favorable for a large and permanent piece of mining property.

Inyo.

A GOOD SEASON ASSURED.—Inyo Independent, Feb. 26: Frank Fitzgerald came in from Modock on Tuesday's train, the object of his visit being to procure a big team to haul ore from Modock to Keeler. He confirms the report published last week of the good prospects for lively times in mining circles for the coming season. J. J. Gunn has a lot of ore ready for shipment at the Minnetta mine, and no team to haul it. Niel McLean has taken a contract, which will keep him busy for some time, to haul wood for Fitzgerald's mill. The Snow's Canyon mill is to be removed, and, with the addition of new pans and settlers, fitted up in first-class shape. The new road completed to Wild Rose, will open up a fine mining property there. As before stated, the prospects at Darwin are better than for many years past.

A MINING ENTERPRISE.—Inyo Index, Feb. 27: Frank Fitzgerald, the boss mining man of Inyo, came to town on Tuesday. He informs us that he has purchased the tailings of the old Minnetta proposition—aggregating about 4000 tons—and intends to work them. He has removed the old five-stamp mill from Snow canyon to Modock and added two pans. The tailings assay \$14 per ton, and Mr. Fitzgerald feels confident that he can save at least half that amount. He has contracted for the delivery of 300 cords of wood at Modock at \$12.50 per cord. This seems a big price, but as it has to be hauled 26 miles, it is certainly worth that amount. Mr. Fitzgerald expects to start the mill about the first of September, and will run it for all there is in it.

Placer.

DUTCH FLAT RICHNESS.—Cor. Placer Republican, Feb. 26: Through the center of our town runs a ravine that was at one time in the early days an outlet for some mines at the upper part of town. When the heavy rains cause high water, the boys get in and do some mining on a small scale, and always manage to pick up spending money. Some of the best mining ground in this section is right under the town, and many have a small fortune near their doorstep. If we ever get permission to mine, no doubt some will move to non-mineral land and turn their town lots into mining claims.

Mono.

THE BODIE CON.—Bodie Miner, Feb. 26: We will make a run on Bodie ore after the first of next month. There were employed eight miners, one carman, and jointly with Mono one engineer, one blacksmith, one laborer, one watchman, one foreman.

THE MONO.—North drift from top of No. 1 upraise, 100 feet above the 700-foot level, was extended 18 feet. We have a small seam of rich ore in this drift, which we are saving.

THE BULWER CON.—In this mine, stoping was discontinued several days ago, on account of the chutes being full of ore, and also because the Bodie Co. require the use of the mill for the purpose of making a crushing of their own ore. The mill is still pounding away on Bulwer ore, and it will take at least the first of next month to finish this crushing and make a thorough clean-up of the mill. While being deprived of the use of the mill, prospecting for other ore

deposits is being energetically carried on in virgin ground, where valuable discoveries are liable to be made any day.

SUMMIT.—The work of repairing the incline shaft is completed, and it is now in good working condition. The pipe to convey the water from the Lent shaft to the Summit hoisting works is already laid, ready for use as soon as needed. The boiler is in place and the machinery work is nearly finished. Steam will soon be applied, and under the new conditions work will be greatly facilitated. The extraction of ore goes on steadily.

Plumas.

TUNNEL.—Bulletin, Feb. 23: During the past two months, C. H. Clark has been driving a tunnel on the Light Pocket ledge, owned by A. C. Light of Taylorville. Mr. Clark leased the property for six months, beginning work the first of the present year. He has driven the tunnel 115 feet, and a few days ago struck the ore vein, which is small but looks well. Mr. Clark will continue the work. Some very rich deposits have been found in this mine, and Mr. Clark is liable to find more of them at any time. This week J. E. Smith, Supt. of the Sun mine, will go to Cromberg to resume work on that property. Ten or 12 men will be employed. The debris is dumped on ground owned by the company, none of it reaching the stream. Mr. Smith thinks they will be able to work all summer. The company, Oakland men, own about 300 acres of ground. From J. A. Edman, who was in town to-day, we learn that he has about 300 tons of ore broken in the Diadem mine. The mill was started Saturday, and will probably run all the season. The prospects of the mine are good. A large body of medium grade ore has been developed close by the old stopes. For several months past John Taylor has been driving a tunnel in the Round Valley Consolidated, near Greenville, to tap a vein of ore at greater depth. It is expected that he will reach the ledge in a few days. McIntyre & Warren continue work on the Blind lead at Wolf Creek. We are informed that it is the intention to erect a mill on this property during the coming season. It is rumored that much good ore has accumulated from the development work which has been going on in the Indian Valley mine. While in Crescent Monday, we learned that the large ore body in the Reward mine, Genesee Valley, had been cut at a depth of 500 feet. It carries copper, silver and gold, and assays very high. It is considered an important development, and may lead to extensive operations in that section next season. It is reported that Joseph Gruss, owner of the Genesee mine, has again started his mill. The ore is supposed to be very good. No doubt this is a fine property. It is known that much gold has been extracted and no fuss made about it.

NOTES.—Plumas National, Feb. 27: C. H. Olark, who leased the pocket ledge belonging to A. C. Light, near Taylorville, has a tunnel in some 120 feet. A few days since he struck a small vein of ore which looks first rate. We expect to hear of a rich pocket being struck before long, as in former years some rich places were found in this mine. J. A. Edman informs us that he has been working in the upper level most all winter, and commenced crushing ore the first of the week. The mine looks well, and he expects to take out some money this season. J. E. Smith will go up next week to take charge of the Sun mine, near Cromberg. This property is owned by Oakland capitalists. Some 10 or 15 men will be employed during the season. The Genesee mine, owned by Jas. Gruss, started up last week. This is a fine mine, and has paid the owner good dividends in the past. He is down a considerable depth, and some rich ore will be taken out this season. We learn that quite a body of ore has been cut at a depth of about 500 feet, in the Reward mine, situated near Genesee valley. It prospects well and is said to carry copper, silver and gold. If this is so, large operations may be looked for in that section before long. W. S. Dean came down from his mine, near Genesee Valley, the first of the week. He says the mining interests in that section are looking up both in copper and gold, and that the time is not far off when the copper mines near Genesee will form one of the industries of Plumas. At the Argonaut mine, situated on the North Fork, Foss and Mechling owners, a new tunnel has been run this winter, which has made some new and favorable developments that promise well. This mine is in a section that has paid rich in former years, and there is every reason to believe that the owners will develop a good paying property when once they get in. At the Bonanza drift mine, Schmidt & Gamble owners, a tunnel has been run some 480 feet, when gravel was struck, but the tunnel is too high, and water coming in so fast, no shaft could be sunk to bottom of the channel. There is no doubt but a rich channel will be developed in the future, but a new tunnel will have to be run in order to bottom it. There are about 45 men at work in the Thistle shaft. The Claybank mine, near La Porte, is being pushed ahead.

San Diego.

PICK AND SHOVEL.—Julian Sentinel, Feb. 25: The new boiler for the Helvetia will soon be put in place and the stamps set running again. The Kuester people have their new stamp mill nearly completed. They are also developing the Dora. The Ella mine is being put in shape by C. E. Smith and Geo. Plant; a new track and repaired car are among the improvements. The Ruby Co. continue to develop their valuable property. This mine bids fair to become a bonanza some of these days. The Cincinnati Bell and Gold King are at work as usual. A hoisting engine is expected to arrive soon for use at the first-named property. Al Frary and Robert Johnson have been busily at work clearing out the mouth of their tunnel on the Eagle that was caved in by the big snow.

Several properties that have lain idle during the winter months, it is expected, will now be started up, and a revival in mining matters is predicted for the coming season. Freight wagons loaded with pipe for the Bailey Bros.' Ready Relief mine and mill water system at Banner, passed through Julian Sunday. This is the first delivery of the immense amount of heavy freight that is to transform the Bailey Bros.' valuable properties into a wonderland of enterprise.

Siskiyou.

ALONG THE KLAMATH.—Cor. Arcata Union: The mining interests as a whole have been fairly good so far this season. The scenes along the river present one of activity, and the muddy color of the stream tells better than words of the various sluices dumping their tailings into its seething waters. Beginning ten miles below Martin's ferry, and on the summit of Morrock Hills, is the new mine of the Morrock Hill M. Co. The company has put on the water of Capbell creek and are prospecting a gravel deposit, some 2000 feet above the Klamath river. As this is a new departure to miners on the river, and freely criticised by many men having operations of their own, it is looked upon as a test case, and I hope will yield largely to parties interested, though all indications point the other way. Some Del Norte capitalists have invested in the enterprise, and though amateurs at the business, are willing to put up the necessary coin to give it a fair trial. This in itself is to be commended. This mine is located on the old sheep ranch of Lamb and Hadley. About one mile above Capbell creek, and on the north side of the river, is situated the Young mine, owned by the heirs of Captain William Young, a Mexican veteran. The property is leased to parties who pay a monthly rental of \$60, and, considering their mode of work, is doing fairly well. Directly across the river from the mouth of Capbell creek, and on the south side, is the location of Capbell Bar, a claim which promises to do well, from present prospects. About one-half mile above Capbell Bar, and along the river, is the mining claim of O. O. Quick, who has lately put on a 7-inch pipe and canvas hose, and is struggling through a streak of blue mud. The boys say when he desires to shut off the water, he throws his hat over the nozzle. One mile above the Young mine, and on the same side of the river, is the location of Moreop, a small mine, run on the plan of pick and shovel, and ground sluices. Located below the mouth of Tulley creek is Kanick, a promising bar, on which a water privilege has lately been filed and some work done, though no mining at this writing. At Witchpeak, we have the claim of William Lord, operated by Chinamen. The location is low and the harvest fair. One and a half miles above Witchpeak is the justly celebrated Saints Rest mine. The bar is pretty well worked off and the water low. Big Bar, the claim of mountains of tailings, is a total wreck. The ditch is gone, the sluice boxes covered up, and desolation marks every point of the once greatest claim on the river. A short distance above the Big Bar claim is the Bristol mine, owned by Lord and Allen, which is doing well. Some distance above the Bristol mine is the Red Cap mine, owned by Lord and Allen, and operated by A. H. Allen, a man of 20 years' experience, who, by his systematic method and thorough mastery of business, succeeds where others failed.

QUARTZ.—Yreka Journal, March 2: Clarence Davis and Arthur Scheld have started up their little prospecting quartz mill, made by themselves, and crush about 100 pounds of quartz per hour. It is located at Mrs. Steele's place on Yreka creek, just south of town, where they get the use of Scheld's water works' boiler for securing steam. The quartz crushed is hauled from Long gulch, about two miles north of Yreka, where W. W. Davis and James Mann have sunk down some 40 feet, the quartz showing gold to the naked eye in great abundance.

NEVADA.

Washoe District

CON. CAL. & VA. MINE.—Virginia Chronicle, Feb. 27: 1100 level—The upraise which was started at the mouth of the west crosscut No. 3, started from the main south drift, 310 feet south from the shaft station, has been carried up 37 feet; total height, 102 feet. From this upraise 73 feet above the sill floor, an east crosscut has been advanced 20 feet, the face showing some quartz of low assay value. The north lateral drift started at the shaft station has been advanced 45 feet; total length, 175 feet; in porphyry. 1500 level—The south drift which was started from the upraise 43 feet from the sill floor, which was carried up from the end of the crosscut run west 36 feet in from the south drift at a point 155 feet south from the shaft station, has been advanced 10 feet in quartz of low assay value. 1600 level—Have been retimbering and repairing the main south drift on this level, and are continuing the work of prospecting upward from the old sill floor. 1650 level—Have continued to extract ore of fair quality from the drift run west from the top of the upraise carried up 59 feet above the south-west drift. Ore of fair quality has been extracted from the drift run east from the winze No. 3 (down 73 feet) in working upward from that point. From the north end of the California ground on the west side are working in the old stopes and extracting therefrom some ore of fair quality. 1750 level—In working out and upward from the bottom of winze No. 2, sunk from the 1650 level, we continue to extract ore of fair quality. Have also extracted some milling ore at the point where the upraise, carried up from the crosscut run west from the southwest drift, made connection with the stopes on the eighth floor. Have continued to extract ore of average quality at the point where the upraise from the southwest drift 70 feet north from the south line of the California ground connected with the eighth-floor stopes. 1800 level—Along the south end of the drift

running south from the crosscut run east from the winze No. 1, sunk from the 1750 level, we have continued to stoop out ore from the sill floor upward of milling value. There has been extracted from all parts of the mine during the week 1013 1530-2000 tons of ore, which was shipped to the Morgan mill. The average value of all of the ore worked at that mill during the week, 980 tons, was \$19.45 per ton. Bullion now on hand in our assay office, assay value about \$12,300. Bullion shipped to Carson Mint, assay value, \$13,319.40.

OPHIR.—1465 level—The north drift started from the drift run west from the winze 122 feet below the sill floor of the 1300 level, 80 feet west from the winze, has been advanced 30 feet; total length, 93 feet, in a porphyry and quartz formation, which yields a low assay value. Have continued the work of repairing and retimbering the main south drift on this level.

MEXICAN.—On the 1465 level the crosscut running east from the bottom of the winze, sunk 101 feet down from the end of the crosscut run west 132 feet in from the main north lateral drift near the south boundary line of the mine, has been advanced 21 feet; total length, 100 feet, the face being in a porphyry formation carrying slips of clay.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. west drift from the shaft has been extended during the week 18 feet; total distance west from the shaft, 1700 feet, the face being in hard porphyry. The Union Con. south lateral drift from the joint west drift, at a point 1570 feet west from the shaft, has been extended during the week 20 feet; total length, 186 feet. The face is in porphyry and clay.

ANDES.—North drift from east crosscut No. 4, on 420 level, was advanced 16 feet, and connected with west crosscut. West crosscut from north drift from east crosscut No. 4 was extended 16 feet; formation, quartz. Work has been resumed in the face of east crosscut No. 4 and advanced 12 feet; face in quartz giving low assays.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 520 feet; face in quartz and gypsum giving low assays.

EXCELSIOR.—East crosscut, 150 feet south of north line, 600 level, is out 295 feet; face in porphyry.

ALPHA.—North drift from the winze, 20 feet north of shaft, is out 179 feet; face in quartz yielding low assays. The southwest drift from the Ward shaft, 1800 level, is out 1157 feet; face in clay and porphyry.

NEW YORK.—The west drift from the shaft, 650 level, is out 435 feet; face in porphyry. The raise from No. 4 west crosscut, 650 level, is up 33 feet; top in quartz showing bunches of good ore.

POTOSI.—The Potosi and Bullion joint crosscut, 1500 level, was advanced 24 feet; total length, 112 feet; face in hard porphyry. The Potosi and Bullion joint crosscut, 1400 level, was advanced 24 feet; total length, 205 feet; face in soft porphyry.

CHOLLAR.—Are retimbering north drift from shaft, 650 level. East crosscut, 74 feet south of north line, 1500 level, is out 193 feet; face in porphyry. East crosscut 50 feet south of joint west crosscut, 1640 level, is out 44 feet; face in soft porphyry.

BULLION.—The east crosscut on the north, 1400 level, is out 205 feet; face in soft porphyry. The east crosscut, 100 feet south of north line, 1400 level, is out 80 feet; face in porphyry. The joint east crosscut, 1500 level, is out 112 feet; face in porphyry. The east crosscut, 120 feet south of the north line, 1500 level, is out 103 feet; face in porphyry. The south drift, 1500 level, is out 240 feet, south of the north line face in porphyry. The southwest drift from the Ward shaft, 1800 level, is out 1157 feet; face in clay and porphyry.

WARD COMBINATION SHAFT.—The southwest drift, 1800 level, is out from the shaft 1157 feet; face in porphyry.

SIERRA NEVADA.—The north drift from the Kenosha tunnel was advanced 35 feet through a porphyry formation; total distance of 647 feet. The joint Sierra Nevada and Union west drift, 900 level, is out west of shaft 1700 feet; face in hard porphyry.

UTAH.—The west drift from the shaft station has been extended 62 feet; total length, 77 feet; face in porphyry showing some clay.

BEST & BELCHER.—900 level—West crosscut No. 1, 100 feet north from top of upraise from 1000 level, has been advanced 16 feet through soft porphyry; total length, 102 feet.

GOULD & CURRY.—200 level—Northwest drift, started 435 feet west of shaft, has been extended 25 feet; total length, 45 feet; face in porphyry. From upraise No. 2, 65 feet above this level, have started a south drift and extended same 20 feet; face in quartz. 400 level—At a point in west crosscut No. 1, 140 feet from south drift, started a northwest drift on a body of quartz, west of the old stopes, the same giving low assays, and advanced it 12 feet. Have discontinued all work on the 350 foot level. On the Suro tunnel level the joint north drift with the Savage Co. was advanced 17 feet; total length, 190 feet; face in porphyry.

OCCIDENTAL.—From the west crosscut in the south drift, 350 level, have started a winze in fair grade ore. The winze from north drift, 350 level, is down 55 feet below the 450 level; bottom in quartz and porphyry. No. 2 winze, 650 level, is down to the level of the 750, and work at that point has been stopped until connection can be made with the main north drift on 750 level. The north drift, 750 level, has been extended 15 feet; total, 283 feet; face in quartz and porphyry. The south drift, 750 level, is in 366 feet; face in low grade quartz. The drift from the Suro tunnel has been extended 30 feet; total length, 382 feet.

Ferguson District.

A DISTRICT FORMED.—Cor. Pioche Record, Feb. 27: In the summer of 1889 two young men, John E. Ferguson and Joseph Sharp, started from Hiko on a prospecting tour, and

soon after leaving home they discovered that they had neglected to take with them anything to break rocks with, consequently they kept an eye open for something to supply the place of a hammer. The first and only thing that was discovered was the main part of a monkey wrench, with all attachments long since departed, and with this they proceeded on their trip, and going into the mountains in the Bennett Springs range, on the east side of the Dry Lake valley, about 15 miles south of where the road from Pioche to Hiko enters the valley, they discovered some very rich float, with nothing but the old monkey wrench to prospect with. Hence the name given to their discovery was the Monkey Wrench mine. In the summer of '91 the Fergusons bought out Sharp and proceeded to develop their new discovery, and were crowned with the unexpected success of assays running as high as 1716 ounces. They then formed a copartnership with a Mr. H. A. Cohn, of Morey, who is a gentleman of means and enthusiastic on the question of mines, who came to see for himself and was much elated with what he saw, and suggested a vigorous prospecting of the mine. About the first day of 1892, the Ferguson brothers and J. J. Manning, Mr. A. W. Geer and W. A. Wilson began the work of development. Others began to arrive soon after and some other strikes were made, among which stands high up one opened by Messrs. Cassidy, John Roeder and J. Conaway, which bids fair to be of vast wealth, being rich in horn silver. The eastern end of the Monkey Wrench has been sunk about 10 feet and is considered a wonder, being composed largely of chloride ore. Parties of prospectors have traced the same formation and lodes from six to ten miles and brought back ore that cannot be distinguished from the richest croppings of the first discovery. On the 20th inst. the miners met at the camp of the Ferguson brothers and J. J. Manning, and organized by calling Mr. Joseph Conaway to the chair and Samuel Reed as Secretary. The question of a name for the new and rich district was discussed, and on motion of Mr. W. R. McFadden the name was declared to be Ferguson, in honor of the discoverer. The boundary lines of the district were claimed to extend from Cliff Springs on the north to Riggs Springs on the south, and from Meadow valley on the east to Ely or Dry Lake valley on the west. On motion of J. J. Manning, assessments should be worked at the rate of four dollars per day. The meeting then adjourned, with three rousing cheers for Mr. John E. Ferguson, because he was the discoverer of the wonderfully rich mining district.

Jack Rabbit District.

LAIN OFF.—Pioche Record, Feb. 27: Twenty men were laid off here Tuesday by order of superintendent, which instructed Mr. Hazelgrove to reduce his force to 15. The boys all had money galore and most of them departed next day for Utah and Colorado. The few that remain are in doubt as whether to take the desert afoot or to try and "stick it out" and trust to a resumption of work at an early date.

Pioche District.

GIVEN THREE TIME.—Pioche Record, Feb. 27: Quite a number of hands at the works were given their time yesterday, and as soon as the furnace, now running, stops, the balance of the employees will follow suit. A number of the hands relieved at the works have resolved to remain here until work is fairly resumed again. They say Pioche is good enough for them, and though times are dull, the probability is they would not better themselves by going elsewhere.

Tuscarora District.

NAVAJO.—Times-Review, Feb. 27: South intermediate below the 350-foot level extended 5 feet. A drift has been started south on a small seam of ore showing in the old 350 working. West intermediate below the 300 extended six feet.

BELL ISLE.—The crosscut from No. 1 vein, 350-foot level, extended 7 feet, cutting some low grade ore. North intermediate below the 350-foot level extended 17 feet, showing some good ore. The crosscut from No. 1 raise extended 20 feet.

NORTH BELLE ISLE.—East crosscut, 400-foot level, No. 3 drift, extended two feet in very hard rock. North intermediate drift above the south 500-foot level extended 19 feet, showing a good vein of rich ore. North intermediate, No. 2 vein, extended 7 feet and connected with the north section of No. 1 vein. No. 4 north drift, south 500-foot level, extended 8 feet and a crosscut run east therefrom 14 feet.

NEVADA QUEEN.—Second Level—No. 1 south drift extended 23 feet, and started to put up No. 3 raise, which will be about 25 feet to foot-wall side of the vein. South intermediate drift advanced 32 feet. Fourth Level—West crosscut raise extended 22 feet in low-grade ore; average assays, \$982 per ton; will make connection with south intermediate drift this week.

NORTH COMMONWEALTH.—Second Level—East drift from winze advanced 19 feet, and produced 12 cars of ore; assay, \$15 per ton; will reach 90-foot drift this week, about 45 feet farther to run. No. 1 raise, from north intermediate, up 29 feet.

DEL MONTE.—Second Level—Joint raise stope produced 8 tons first-class ore, assay \$265 per ton, and 14 cars second-class, \$41 per ton. West drift from North Commonwealth line advanced 31 feet in vein formation. West intermediate drift from joint raise stope advanced 15 feet, exposing small seam of good ore. No. 3 raise from west end of stopes put up 31 feet. Third Level—No. 1 north drift extended 17 feet; cut several small seams giving low assays.

COLORADO.

THE SMELTERS.—Denver Times, February 26: Smelting men predict a larger production this year than last. Their statements are based upon a conservative estimate. This means a larger output from the mines of this State,

which can well be believed when the many new discoveries are recalled. The Denver smelters have been receiving Creede's product since the camp has been shipping, their share of it at least, for Pueblo and nearer points have their percentage. The class of the ore is a silver, running in grade from 60 to 80 ounces. The smelter production will be much larger than last year. The actual amount of the silver output would be much greater, but it was difficult to predict the product because of the political significance which the white metal now holds. Should it remain at a decent figure, the production would be heavy. If it dropped to 75 cents many of the good producers would be "knocked." The bulk of the ore received by Denver smelters is from Leadville. The quantity from Aspen is not so large as formerly received. The value of the ores from these two great camps does not differ materially, the general run being from 30 to 100 ounces of silver. The class of ore does not change. The Boston and Colorado receives the bulk of its Leadville ore from the Henriette and Maid of Erin. They are principally copper producers. The old camps seem to be steadily holding their own, while the new ones give promise of better things. All of the plants here have made great improvements in their works during the past year, particularly the Omaha & Grant and Boston & Colorado. The Boston & Colorado expended from \$60,000 to \$70,000 last year, and, according to Mr. Pierce, the manager, will expend as much again this summer. The smelting men are loth to talk on the smoke nuisance. The Boston & Colorado and Globe claim that their smoke does not enter the city but the adverse winds carry it the other way. This would leave the Omaha & Grant to shoulder the responsibility, but their 350-foot smokestack will remedy the difficulty.

DAKOTA.

THE MINING FEVER.—Deadwood Pioneer, Feb. 26: Interest in mining properties in this section promises to be greater this year than ever before. Travelers from the mining districts entertain their friends with many fascinating word pictures of mineral wealth, both present and prospective. In the hotels, the air is laden with discourses on gold and silver, coal and galena, tin, lead and copper. Occasionally a railroad projector may be seen devising, figuring upon and, sometimes, concluding his plans for running his rails into these attractive regions of mining industry. The eastern visitors have aroused a veritable boom in mining properties, and they talk on hematite or free-milling and refractory and other classes of ores with all the fluency of a Pennsylvania expert. The most active movements toward securing properties bearing precious metal seem to have now just fairly begun. So far as can be gleaned from the most reliable authorities, the Black Hills are likely to have the greatest and most satisfactory results from the development of valuable mining districts that have heretofore, practically, lain dormant, and also from the opening of new districts. Some of our districts have awaited the advent of railroad extensions, which now promise to soon provide desirable facilities for easily marketing their valuable ores. Among the mining camps of this class, the most absorbing interest is centered upon the famous Beld Mountain district, of which Deadwood is the distributing point.

A VERY BRIGHT OUTLOOK.—Deadwood Pioneer, Feb. 27: The expectations of those familiar with the ground at Bald Mountain, Ruby Basin, Carbonate and many other of the promising mining districts of the Hills, is that when the snows disappear and prospectors are enabled to work intelligently, some wonderful revelations will be made. None of the ground in these districts has ever undergone a systematic and thorough prospecting, owing doubtless to the large outlay of money necessary to such work, but now hundreds of men, backed by ample Eastern capital, who see that the Black Hills is the place for the safe investment of their money and a guarantee of quick and manifold returns, are awaiting the time when they can begin systematic explorations of these sections. If we are favored with an early spring, which now seems probable, work will be pushed with unprecedented force, and upon the results achieved will be measured the prosperity and progress of this section of the Hills for the next ten years. The Pioneer predicts a very large increase of population, and with it a renewal of growth of all the principal towns of this section.

IDAHO.

WOON RIVER OUTLOOK.—Times, Feb. 26: Never for several years past has there been as much ore exposed in the mines of this region, nor have they generally been so full of promise as at the present time. This satisfactory condition of affairs is not confined to any one vicinity, as all the camps or districts report notable improvement. The Minnie Moore and Relief sale, which is as good as consummated, will revive Broadford wonderfully, as the change of ownership must result in the ultimate employment of 200 to 400 men at these mines alone. The Queen of the Hills Co., whose property adjoins, and which would have to bear unassisted the expense of pumping for many claims if it worked alone, will, as soon as operations are resumed at the Minnie Moore-Relief group, doubtless resume also. With work resumed in the two groups just mentioned, it will not be long before the Lee's gulch and Colorado gulch claims will be worked again. In Star gulch, the two principal groups there will undoubtedly employ a few men each right along. The Captain Jack, which is owned by the Laclede Co., will be worked from early spring, and the Star has been worked all winter by leasers on a long lease. Going up Crox gulch, the School-boy and Cressus groups are the first encountered

which are likely to be operated this summer. At Bullion, the Jey Gould leasers are doing well, and expect to do better. Other leasers on other groups are also doing well. At the Red Elephant group, a splendid record is being made, the mines showing more and richer ore than ever in the history of these claims. It will, therefore, undoubtedly resume the payment of dividends this summer. The Gold Belt claim owners are evidently all awaiting a change at the Camas No. 2. The owners of this property have recently paid off all judgments (but one) against this property, which aggregated many thousands of dollars, and are understood to be in daily expectancy of selling. Further on, the Buttercup Co. is developing a fine property. In Smoky, Sherry's group will pay this year, as it was sufficiently developed and tested last year to demonstrate this; Newt. Revis's and the Minneapolis Co.'s placers will be exploited to a profit; the Galore-Stormy leasers have good remuneration for their work "in sight;" the King of the West Co. is ready to make regular shipments as soon as the roads admit of this; the leasers on the Carrie Leonard group have an abundance of ore; and the Sunday and other claims show much rich ore. Deer Creek will be the banner camp for the next two years at least, even should no new developments be made there. The Abbey owners have a tempting offer to sell. The War Dance is a big property. The Standard Co.'s property (the May Aug) is leased until the 1st of May. Across the creek, the Nettie shows a gr at deal of ore. The Argent and other subdivisions of the French Boys' claims show genuine bonanzas. As to the Red Cloud, it promises to prove the mine of this region, and, even at present prices for silver and lead, is said to show enough ore to pay monthly dividends for six years. On the east fork of Wood river, the North Star group maintains its excellent record of the past four or five years, and still gives employment to a large number of men. The Arctic and Antarctic and several other groups each give employment to a few men; and the Triumph, which has shown considerable ore for years, will surely be put in the dividend-paying list this summer. In Elkhorn gulch, the Quaker City and other claims show pay ore, which will be extracted as soon as hauling can be resumed. The Baltimore & Victoria group is about to be sold to an Eastern company, which will work it for all it is worth. On Boulder creek, there are at least two strong companies that will ship ore regularly during the season. On Warm Springs creek, on Lake creek and in and around Galena are many claims that show much ore. Over the range, Red Wing or Vienna will doubtless have a genuine boom. The Vienna Co.'s mill will be started, and quite a force of miners, millmen, teamsters and others will be employed. In Beaver gulch, the Silver King will employ quite a force of men, and several other claims will give employment to a few each. The upper country—Bayhorse, Clayton, Challis, etc.—promises to boom this summer. Many of the properties mentioned will be operated, no matter what fate is meted to the silver bill now before Congress. But there is no doubt that, if that bill becomes a law, all will be operated, and that work will be resumed on many more which are now idle. In fact, should the bill pass, Wood River and vicinity would enjoy a genuine mining boom.

DE LAMAR.—Nugget, Feb. 27: The Delamar Mining Co. has, with its usual regularity, paid its third dividend. Work at the mine is progressing in the usual manner, and the mill never stops. Everything in and about this company's property goes on so smoothly and regularly that there is comparatively little to report. The Nugget will endeavor to give all the reports and items obtainable, and desires any reliable information in regard to the numerous properties and prospects of the county. Items of interest will be gladly received and published. Let me know what you are doing and the paper will help you. We are in a mining country and let us pull together.

MONTANA.

THE WEEK IN BUTTE.—Inter-Mountain, Feb. 27: Silver still hovers about the 90-cent mark, and the mining situation has not changed for the better since a week ago. The mining camps of the west, where silver is the staple production, are all in the same boat, and the outlook, at the best, is not very flattering. Fortunately for her business interests, Butte is not entirely dependent upon her silver mines, and if every one of the silver producers should shut down, Butte would still be the greatest and busiest mining camp on earth. Her great copper mines give employment to thousands of men, and their capacity for furnishing employment to labor is increasing every day. About the copper mines and smelters all is a scene of bustling activity, and several of the larger companies are making preparations to greatly increase their output. The force of miners at the Mountain View was increased during the week, and pending the construction of the spur, the ore will be delivered to the Montana Central tracks in wagons.

SILVER BAR SHIPMENTS.—The silver bullion shipments from Butte for the week ending last night were as follows:

	No. Bars.	Estimated Value.
Butte & Boston	10	\$15,936
Blue Bird	9	14,892
Lexington	11	24,160
Alice	21	31,056
Moulton	7	10,992
Totals	58	\$97,136

NEW MEXICO.

CENTRAL.—Silver City Enterprise, Feb. 26: Geo. T. Reed, who is a party in interest in the new gold strike at Central, brought in 14 sacks of rich ore Saturday. Wherever broken the rock showed gold plentifully, and as the ore

promises to be continuous, all hands are highly elated. The strike has been the means of starting up claims which otherwise would have remained idle.

SILVER CHORD.—Recent exposures in the Silver Chord mine, the property of Allen & Spaulding, of Pinos Altos, show an average value, as per assay, of \$325 per ton in silver, at 90 cents per ounce. As depth is gained, the vein is becoming better defined, and it is by no means improbable that the next ten feet will develop ore rich in silver, the occurrence of which may possibly indicate a new era in the development of Grant county. A. S. McDonald has in his possession a nugget recently picked up in San Domingo gulch, near Pinos Altos. The specimen weighs four ounces, and with the exception of a few pennyweights of quartz adhering, is a solid mass of gold. Mc estimates the nugget to be worth \$70, and has no desire to dispose of it at that figure. San Domingo gulch has a record as a producer, but as water is scarce, but little placer mining has been done. With abundance of water, there is no question that the gulch could be made to yield bountifully. Whoever is fortunate enough to discover the ledge from which the gold comes, will have a bonanza bigger than any Creede or Cripple Creek can furnish.

OREGON.

WILL SOON START UP.—Bedrock Democrat, Feb. 27: The Washington Gulch Placer Mining Co., of which Mr. Fred Pfau of this city is manager, is preparing to start operations at an early day. Mr. Wm. Deemer, one of the heaviest stockholders of the company, arrived from Portland yesterday to look over the situation. The property owned by this company is the old Chas. St. Louis gravel mines on Washington gulch, west of the city about five miles. Last fall, ditches were dug and reservoirs constructed, and there will be nothing to prevent the starting up of operations just as soon as the spring flow of water commences.

UTAH.

A STEIKE.—Park City Record, Feb. 27: It was told on the streets yesterday morning that the Mears heft had cut the Daly vein at a depth of something over 500 feet and that about 18 inches of first-class ore was the result. The news did not partake of the nature of a rumor, but was told for an actual fact. However, an inquiry at the mine was met with a flat denial of the news, Mr. Morgan saying that there was absolutely nothing in the assertion—that if there was he would certainly know something about it. There was no more ore in the Mears shaft than had been there for several weeks. The shaft, he said, was in favorable looking ground, but the Daly vein had not been cut up to date.

A NEW MINING COMPANY.—The Record was informed this week by a Salt Lake man that it was rumored on the streets of that city that a new and big corporation had recently been formed for the purpose of carrying on mining in Park City, and that it would be known as the Hearst Mining Company and would absorb both the Daly West and Mears groups. The rumor is, of course, denied by those who should know, but from the location of the two groups and their well known value, such a move would be a strong one on the part of a strong company, for the ground is going to develop into one of the richest producing sections of this wonderfully rich district.

CRESCENT.—The work of overhauling the Crescent concentrator and putting it in shape for the coming season will commence about the first of March, so the Record has been informed by Mr. Ed. Stringer, who has had charge of the mill for several years. The indications are that the present will be about the liveliest season the Crescent has seen for a number of years. Manager Burton was down from the Lucky Bill yesterday and reports matters as moving quite briskly, notwithstanding a scarcity of timbers. The vein encountered is being drifted on, and he expects to cut the chimney of ore exposed in the old shaft in about 60 days.

WASHINGTON.

PREPARING FOR INCREASED PRODUCTION.—Okanogan Outlook, Feb. 27: S. H. Black representing the Everett gold mining and milling company at Loomiston, stopped in Conconully Wednesday on his return from Coulee City, where he was sent to make arrangements for shipping the machinery with which it is intended to increase the capacity of the War Eagle and Black Bear mill. He says the company expect to have the additional five stamps in place and ready for operation by the 15th of March, and that about the first of May ten stamps more will be added, giving the mill a capacity of 40 tons per day. The company is now working 50 men and the number will be greatly increased as the work progresses.

THE REN JACKET.—Redmond & Hendrick finished their contract of sinking 26 feet on the Red Jacket and came to town the first of the week. They immediately took another contract of 25 feet and returned to the mine Thursday. This is one of the gold claims recently bonded to H. D. Andrews and Jas. F. Wardner, of Fairhaven, for \$20,000. Mr. Andrews has been here for some time looking after the property, and is well satisfied with the work so far accomplished. He proposes to sink 100 feet on the vein, and then prospect the ore chute by drifting from that level. As soon as the 50-foot point is reached, if the showing is considered sufficient to justify it, a five-stamp mill will be erected near the claims, to treat the ore as fast as it is taken from the mines. The ledge was two feet wide at the surface and gradually increases with depth.

MECHANICAL PROGRESS.

Iron and Steel in Building.

The propriety and even necessity of a large use of iron in buildings, so as to attain the nearest possible approach to fireproof structures, is a matter now almost universally conceded. Yet the disastrous fires, which occur too frequently, even in the better class of our city buildings, in which iron is more or less used, point out clearly that there is something still lacking in this direction. Either iron is not so largely used in any given structure as it should be, or it is not judiciously constructed and placed.

The *American Manufacturer*, speaking in this connection, says: "The use of iron and steel must not stop with the putting in of a few girders and columns where strength with a minimum of weight and bulk is a desideratum. The futility of this as a safeguard against destruction of a building by fire has been exemplified again and again in every city in the country. It does not even provide 'slow burning' construction. A building may be as strong as iron will make it, but if that iron is only disposed in the form of columns and girders, fire will go through it as quickly as though there was not a piece of iron in it larger than a nail.

As yet the uses of iron and steel have not become general in construction, have been mainly confined even in the better buildings to girders, columns and floor beams, leaving to be built of wood all interior details. About the only lighter form of building material in which iron in any marked degree has supplanted the use of wood is in the various forms of metallic lathing, and these have shown their superiority from both technical and economical standpoints so well as not to need any further comment here.

The state of things noted above has not been entirely the fault of oversight of architects, either. Manufacturers have provided in abundance beams and all the heavier structural shapes, but what may be termed the artistic treatment of iron has been practically neglected, and architects have been forced to use wood for interior work from the very lack of other suitable material. Taking these facts into consideration, we would urge upon manufacturers that more attention be turned to the production of material suitable for architectural details.

The solution of the problem calls for the exercise of both artistic and mechanical ability of no mean order, but we believe it is within the reach of American artisans, if effort is intelligently turned in that direction; and that such efforts would receive the co-operation of our best architects, and be reciprocated by them, we are confident. The difficulties to be encountered from a mechanical, commercial, and we may add from an æsthetic standpoint, are no greater than have been met and overcome again and again by engineers, and the benefit to be derived both by the promoters of such improvements and the users, are far more certain than those which many other things, once innovations but now virtual necessities, have had to contend with."

In the exceptionally large buildings now in process of construction or lately built in this city, the conditions alluded to by our contemporary appear to be quite fully considered, and there can be but little doubt that such buildings are as thoroughly fire-proof as money and skill can make them. That class of buildings is not generally used as warehouses where thousands of tons of combustible merchandise are constantly stored. With such storage no human ingenuity can render a building safe from destruction by fire. Neither can any possible human structure be rendered safe in such mammoth conflagrations as in years past have visited Boston and Chicago. In such cases the heat is so great that nothing of either brick, stone or iron can stand before it. In such a heat the very walls of our most refractory furnaces would crumble into sand, or become volatilized and pass off as the vapors of combustion. The rubbish left upon the ground after the great fires in the two cities above named, represented but a mere fraction of the "fire-proof" material which entered into the construction of the buildings destroyed. The intense heat from those fires had literally "eaten up" brick, stone and iron as though they had been but shavings.

INCREASED DEMAND FOR COPPER.—The rapidly increasing demand for copper wire for long-distance telephones and for transmission of power is calling for large amounts of copper. Long-distance telephones require, in all cases, return wires. The Bell Telephone Company has now in course of construction some fifty different lines of long-distance telephones, each of which requires two lines of wires—equivalent to 100 lines of

single wires. The distance from New York to Chicago, which is the longest distance now in course of construction, is 980 miles. The wires connecting these two points will consequently be 1960 miles. The size of such wire calls for 174 pounds to the mile, or a total for that line alone of 170 tons.

Competition in Mechanical Work.

Competition in mechanical work has done much to improve and develop new and progressive features in machinery of every description. The shop, the factory, the mill, the farm, etc., have all been greatly benefited by the efforts of any given shop to turn out a better class of work than its neighbor. Of course improvements in machinery are chiefly due to inventors, but the men who put the inventor's ideas into practical shape are also entitled to a good share of credit for the skill and judgment employed in executing the mechanical work, no matter how complete the drawings may be from which such work is done. Probably there is no manufacturing center where these facts have been more fully shown than in this city of San Francisco. We have numerous wide-awake, energetic machine and mill builders in this city between whom there has ever been a generous, healthy competition.

Quartz-milling was exceedingly crude at the time that business was first entered upon in California, and more progress has been made in the science and methods of reducing ores during the 35 years of its progress in this State than in all the preceding years of its history from the very beginning of mining. Inventors, of course, have been the chief factors in our success, but the rivalry between our shops has also been an important factor. Milling engineers, inventors and mill builders have been constantly on the alert to detect any little error in construction that may have been made by another. Frequent visits are made by them to all parts of the mining regions to see how the different mills work and stand the wear of the heavy duty that is put upon them. These results of observation are never without profit to all the parties interested, and especially are they of importance to the general progress of the mining industry, which has been the foundation and has contributed so largely to the building up of the great industrial and political empire which has so suddenly made its appearance on the Pacific Coast.

It is thus that competition has worked wonders for all our great industrial interests. The competition to which we allude is altogether a healthy and useful one. It is not a competition which cuts down prices, or in any way creates business antagonism, but it is one which makes people thoughtful, fills them with useful energy—one which leads directly and only to improvement and progress. In no way is progress more readily brought about than by the thoughtfulness and energy born of a generous competition. The art of machine construction, and indeed all industrial art, like scientific knowledge, grows and makes progress only as new thoughts and new facts are brought to light and the latter demonstrated to be facts.

A NEW PROCESS OF COPPER SMELTING. Patents have been issued to T. D. Nicholls and C. James, both of Swansea, and the Cape Copper Company, Limited, London, for an improved process of treating copper ores. The extraction of copper from ore and other compounds containing the same is accomplished, according to these inventors, by this improved process, whereby a good quality of copper is obtained at a reduced cost and in less time than by the ordinary processes. According to this method the inventors proceed in the ordinary way until a regulus or like product is obtained, containing from 65 to 80 per cent of copper, and such a quantity of iron as it may be deemed expedient to retain for the proper "slagging off" of the nonvolatile impurities. This regulus, having been crushed, is calcined until as much sulphur as is desirable has been driven off. The calcined regulus is then mixed with a suitable proportion of crushed but uncalcined regulus, such as previously referred to, or with other regulus of like description, the quantities of calcined and uncalcined regulus being in such ratio that the oxygen contained in the calcined portion will combine with all the sulphur in the uncalcined portion. A charge of this mixture, with the addition of any suitable flux, is then placed in a refining furnace and melted. The volatile impurities, whether left in the calcined portion of the charge or present in the uncalcined portion, are volatilized by the intense heat generated, and are carried away with the discharge of sulphurous gas which ensues. The copper is finally skimmed, brought to pitch and "ladled" or run into ingots or cakes as desired.

SCIENTIFIC PROGRESS.

The Phonograph and Musical Sounds.

Many years ago there was exhibited in Europe an apparatus known as Faber's Talking Machine, which was a most complex piece of mechanism, imitating as nearly as possible the organs of the human voice. It had a complicated key-board, capable of various adjustments, and a bellows representing the lungs. As might be expected, the speech produced by this machine was very imperfect, and but faintly resembled the human voice. It is now of interest only as a mechanical curiosity.

When the phonograph was invented it was naturally compared with the existing talking machine, and the wonderful simplicity of the former was strongly brought out by the contrast. The comparison was unfair, however, for Faber's machine was an attempt to originate speech, while the phonograph only reproduces speech, which is quite a different matter.

The phonograph, and by that is meant the machine under its various forms and names, has, up to the present, served as a valuable apparatus for the analysis of sound, but it doesn't seem to have occurred to any one that in the synthesis or putting together of sounds it is capable of producing supremely wonderful results.

The vibratory nature of sound is well known to students of physics, and it is a matter of common knowledge that the pitch of a musical note depends upon the number of vibrations per second which produce it; but it is not so well known what constitutes the difference between the tone of a violin and of a flute, both sounding a note of the same pitch, that is, having the same number of fundamental vibrations per second.

This difference is explained by the fact that the violin string not only vibrates as a whole, producing its fundamental note, but also in its different parts, producing a number of very rapid vibrations which blend with the fundamental and impart to its peculiar quality of timbre. These extra vibrations are called overtones or harmonics, and it is their presence in a different degree which distinguishes the sound of the flute from that of the violin, or which makes a voice loving, persuasive and sympathetic, or hard, rasping and disagreeable. Were it not for the harmonics, music would be insipid and unpleasant. A tuning fork produces such a tone. It is quite free from harmonics and has pitch only, being noticeably devoid of quality. By means of a number of tuning forks, however, so vibrated as to produce the overtones in proper relation to the fundamental, almost any musical instrument may be imitated. This is the synthesis of sound. A phonographic record of a pure tone would be a sinusoidal curve, but a tone having quality would show the overtones indented upon the sinusoidal curve, producing the ragged lines seen in the pictures so commonly used to illustrate this point in works on acoustics.

In the ordinary usage of the phonograph, or the gramophone, which is better for this illustration, as its record is in the form of curves on a flat disc, the record is made by the voice, but if by any other means the sound curves could be enlarged upon the disc, the machine would reproduce the sounds just as faithfully.

Thus, if all of the tuning forks in the world were destroyed, never to be used again, Emile Berliner, by etching a sinusoidal curve upon his gramophone disc, could, in less than a week, restore to the world its concert pitch.

It would be quite within his powers to cause to be engraved upon the disc a series of curves which would reproduce any simple tune as though it were played upon tuning forks, that is, giving differences of pitch only. Having thus produced the skeleton tune, it would only require an extended series of observations of the timbre curves of the cornet, for example, to impart to the record the quality of that instrument.

If this can be done with the cornet, it would, of course, be possible with any other instrument or combination of instruments. It would even be possible to produce the tones of the human voice itself in this way. The character curves of any given voice being determined, it would be possible to cause the machine to utter the lines of any speech or the melody of any song in the tones of that voice.

If all of the musical instruments in existence should be eternally wiped out, and all men should suddenly be struck dumb, modern science, with the phonograph, could supply the world with music, and mankind with speech and song.

Although the theoretical possibility of such a result is beyond dispute, yet the practical difficulties in the way of such a prodigious

accomplishment are almost appalling. While the existence of all but insuperable obstacles must be admitted, it should be borne in mind that they are mainly mechanical, and that the resources of science are infinite. The first step toward any scientific attainment is to show its theoretical possibility. In this case this has now been done, and hundreds of plans of practical procedure are looming up to mind.

More manual dexterity will not form a necessary part of the musical science of the future. A symphony will some day be expressed in mathematical formulae, but science can never furnish the soul for music or invade the domain of creative intellect.—*Electrical Review.*

EDISON'S SOLAR TELEPHONE.—Our readers will recollect that we some time since described a process or device by which Mr. Edison hoped to be able to receive, through a peculiarly constructed telephone, sounds from the sun, when that luminary should be in one of its periodical spasms of commotion, as it now is, as revealed to the eye by the unusual size and number of spots on its disk. Mr. Edison, it will be recollected, had placed a large number of poles around a small mountain of iron ore, and arranged upon them a circuit of the most perfect and sensitive copper wire. The mountain was to be his magnet, while the wires were to conduct the sound through a proper receiver to the ear. Unfortunately for the experiment, a violent hurricane swept over that part of the country, simultaneously with the present indications of disturbances on the sun, and threw down the poles and wires. The ground was covered with snow and frozen so hard that it is impossible to erect the poles at the present time, consequently Mr. Edison has been deprived of the means of putting his plans into execution during the present most favorable opportunity; but Mr. E. is not discouraged. He will erect his poles as soon as practicable, and secure them so firmly that no ordinary blizzard can overthrow them. He continues to express the most perfect confidence in the idea. He believes that the disturbances will reach the earth on waves of electricity a little more than eight minutes after they have occurred, having traveled with the speed of light at the rate of about 190,000 miles a second. They will be changed into sound when they reach the copper wire, and may then be received by the ear or transferred to wax for subsequent use.

THE EMOTIONS.—Dr. A. Barkan recently gave the third of the series of winter lectures at the Cooper Medical College of this city, taking for his subject "Emotions, Their Physiology and Expression." Concerning the emotions of hate, fear, disdain, scorn, anger and horror, usually represented by facial expression, and in regard to their origin, influence, source and expression, Dr. Barkan said: "It has been noted in all ages that emotion possesses a natural language in expression. The medium conveying our inward feelings to our fellow-creatures—the frown of anger, the quiver of fear, the anguish of suffering, the glances of tenderness—are in complete accord with the state of feelings possessing the individual. The manner of expression, both facial and physical, is of great importance in our welfare, for not only does it give force to spoken words, but the free expression of outward signs intensifies language and lends an additional charm. The force of inanimate nature is oftentimes rendered attractive by an imaginative process. The sun, moon, wind and rivers are less engaging when viewed merely as physical agencies than when they are supposed to operate by human motives, purposes, loves and hates." In regard to the central seat of the emotions, the speaker said that interesting experiments had recently been made by Dr. Courmont of Lyons, France, in which he had ascertained beyond a reasonable doubt that the cerebrum, or brain, is a center for the registration of certain impressions, and is also the organ of various psychological manifestations. The cerebrum is also the seat of the higher mental faculties and the organ of sense, while the cerebellum, or lesser brain, is the seat of unreasoning faculties, as love, hate, joy and sorrow, or the organ of sentiment."

INSTANTANEOUS PHOTOGRAPHY.—The remarkable degree of perfection to which instantaneous photography has been brought is fully exemplified by the following paragraph: In order to photograph a flying insect, the exposure must last only 1-2500th part of a second. This the French photographer, M. Marey, claims to have accomplished by the aid of a new instrument invented by himself. He has also photographed the blood globules circulating in a vein.

ELECTRICITY.

Electrical Induction.

About one year ago, Mr. Nikola Tesla created quite a sensation in the electrical world by a lecture before the American Institute of Electrical Engineers, in New York, in which he gave a brief account of some wonderful experiments which he had recently made in relation to electrical induction. Those experiments and the explanatory lecture opened up quite a new field in electrical research, and one which promises important results, both theoretical and practical. The interest in these experiments appears to be increasing from day to day, and from the present standpoint, it is difficult to estimate the important results which may be ultimately reached in that direction.

Mr. Tesla is still persistently at work in the direction of practical results, but in a very quiet and unostentatious manner. In the issue of January 30th, mention was made of some experiments by Mr. Edison, in which the principle of telegraphing by induction was applied to the establishment of communication between ships at sea or from a ship to near-by land—say from five to fifteen miles—and, of course, without connecting wires. On board a ship, a metallic condensing surface would be placed near the head of a mast, from which a wire would extend to another condensing plate secured to some part of the hull. A similar apparatus would be placed on the adjoining land or upon a near-by ship. Communication between the two is established by induction, and messages sent and received by proper receiving and transmitting devices connected with either of the condensing apparatus upon the two ships or upon the land. This device has been patented by Edison, and is quite similar in principle to that upon which Tesla is experimenting.

WHAT TELSA'S EXPERIMENTS MAY LEAD TO.

It has been suggested by a prominent electrician, in view of Tesla's experiments, that by the use of a dynamo of sufficient capacity, an inductive current might be sent from the shore to a war vessel within attacking range, which would paralyze her crew, the induction being taken up by the armor plates of the attacking ship. Waves of induction are quite different in character from a direct current. They will pass through air, water and even solid matter, as a brick or stone wall, as readily as light through glass. Such a principle, if made thoroughly practical, would have a high value in the arts of peace as well as war. Such a current would penetrate a fog, for instance—which the most intense arc light will not to any great extent—and might be taken by the receiving apparatus of either a wooden or iron ship as it approached a dangerous coast. By the same means, as above alluded to, devices might be invented by which messages might be conveyed back and forth. Some of the bottom principles of this suggestion have already been patented by Mr. Edison and probably by Mr. Tesla also. These induction waves may also be sent through earth as well as water without connecting wires.

These experiments and the great possibilities which they portend have attracted the attention of scientists and electrical engineers on both sides of the Atlantic. Mr. Tesla, upon invitation, has crossed the Atlantic and has repeated his lecture and illustrative experiments before the English Electric Engineers at the rooms of the Royal Institution, and in the presence of many of England's most distinguished scientists and electricians, among whom were Mr. Crookes, Lord Rayleigh, Prof. J. J. Thompson, Dr. Gladstone and many others. The London Times devoted its first leading editorial column to an approving discussion of Mr. Tesla's work. So great was the interest attached to the subject that the lecture—two hours in length—was repeated the following evening for the benefit of the Royal Institution.

Mr. J. J. McCarty, one of the leading electricians of London, in an interview with a London reporter, said: "I sometimes give myself up to the imagination of what the monitor of the future may possibly be in the event of a great naval war." This remark was called forth by the suggestions which came to him after listening to Mr. Tesla's lecture.

COST OF OPERATING ELECTRIC CRANES. The following facts and figures relative to economy of working the electric cranes on wharf in London are of interest. Formerly there were on the wharf a 10-ton steel crane, a 2-ton steam crane, and two 30-cwt. hand cranes. The cost of coal for driving the two steam cranes only was \$1250 per year, steam having to be kept up night and day.

All four of these cranes were fitted with electric gear, and a dynamo with all necessary wiring, switches and safety fittings was put in, the total cost being \$1500. A gas engine used for chaff-cutting, drives the dynamo, and the cost of the gas for the whole of the work—cranes, chaff cutter and corn crusher, besides an ordinary friction hoist—is given as \$280 for the year, while the amount of the work done has been considerably in excess of any previous year. The cost of repairs and renewals for the year has been a little more than \$25.

THE NEW ELECTRIC POWER SYSTEM, called "the multiple distributing station system," has been devised and put into practical demonstration on Coney Island according to the New York Herald of Feb. 14th. Under this system there is to be no overhead wires, no storage batteries, nothing but quiet, easy motion and good speed. The Herald says: "For a good many months the American Engineering Company has been experimenting in a quiet way, and it is now believed that the new plan has reached the stage of perfection. These are some of the advantages they claim for it: No overhead wires, no conduit, no mechanism in the street, no slotted openings in the streets, no storage batteries, no inaccessible mechanism, no disturbance of the rails, stringers or ties; no danger to horses or pedestrians, and no sectional rails or contact sections. A special track, full of sharp curves, was laid near Brighton Beach, and the visitors were whisked over for an hour or more. When the experiments were over, Superintendent Martin of the Brooklyn bridge remarked: 'This is unquestionably the coming system of locomotion.' About all that there was to be seen, aside from an ordinary car, was an unobtrusive little metal plate, six by eight inches, sunk in the middle of the track, almost flush with the roadbed. These little plates are 12 feet apart. They are no obstruction to ordinary traffic and there is no slot connecting them, and no rumbling noise, as in the cable system. These plates are termed 'heads' in the electrical vernacular. The distributing system is so arranged that all of them are 'dead,' or free from electricity, except the two plates covered by the car as it runs along. A longitudinal metal brush underneath the car takes up the electricity from the 'heads' and communicates it to the motor."

THE LONG DISTANCE TELEPHONE AND INDUCTION.—The *Electrical World* records the fact that a gentleman, in Buffalo, who was recently conversing, through the long distance telephone, with a friend in Cambridge, Mass., distinctly heard the starting and stopping of the electric cars on the street in Cambridge, in front of the office of the friend with whom he was conversing. The same person who communicates the above refers to a still more remarkable circumstance, in that instance however, illustrative of electric induction. The incident occurred in Paris, when certain noises produced at the electric light station in London were heard through the telephone in Paris. The wonders of electricity appear to be so rapidly accumulating that thinking and observing men are at a loss as to where their credulity should cease. The possibility suggested by Tesla and his friends in regard to the newly discovered powers of induction, seem almost beyond human belief; but the facts coming to light from day to day lead us on from one point to another, until we are completely lost in astonishment, and don't know where to stop. The events of the last year appear to point most conclusively to the fact that we are as yet just upon the threshold of still greater triumphs than any which have yet been met with in the study of the wonderful possibilities of electricity.

ELECTRICAL TRANSMISSION OF POWER. Mr. Coleman Sellers recently read a very elaborate paper before the Franklin Institute on electrical transmission of power, in which he said: "I myself think that electricity is the most perfect and economical method of transmitting power, but people are not ready to set aside their steam engines and substitute electric motors for them at once. They will take air that will be given them in place of steam, when they find that a handful of coal will very much increase the power of that air at their works and enable air motors to be used close to the machines to be driven. Electric motors are now used to work 100-ton traveling cranes, and in comparison with square shaft-driving are considered more economical. Electricity, too, is used to drive swinging cranes and drilling machines. It lends itself to division in a manner that is wonderful in the extreme, and permits better results than anything that can be conceived of; the only doubt is that the progress of in-

vention is going on so rapidly that we are almost at a loss to know what particular line should be pursued in preference to others, and therefore, the Cataract Construction Company (at Niagara Falls) proposes to proceed tentatively.

WHAT THE WORLD IS WAITING FOR, and what Edison has promised, is an electric motor that can be operated directly by heat, without the intervention of steam. When that is accomplished, steam will be relegated to the past. That such a result will be reached, by Mr. Edison or some other inventor, can scarcely be a matter of doubt. Until then, we must be content with electricity as a secondary power, a simple carrier of energy. Even in such a capacity, it is working wonders in a hundred different directions. We have already in sight an electric motor which will prove an important advance—one which will do away with the noise and dirt of the steam locomotive on the rail; which will enable us to double the present rate of railroad speed and which will put aside the horse, the trolley, the cable and storage battery. All this Mr. Edison promises to exhibit at the Columbian Exposition. He has thus far proven a man of his word. Let us hope he will not disappoint us in this his latest promise.

A NEW ELECTRO-AMALGAMATING PROCESS has recently been given what is stated to be a successful working test at the Southern Cross Co.'s works, near the Anaconda mine. The Butte *Inter-Mountain* says the process is the invention of four Butte mining men—the Hand brothers and Messrs. Edwards and Merrill—and it was under Mr. Edwards' direct supervision that the tests were made. The process may be briefly described thus: First, dissolving the gold contained in the ore and thus getting it into solution; second, precipitating it by means of electricity into a body of quicksilver at the bottom of the pan—for it is a pan process. Quite extensive experiments have already been made upon Southern Cross ore with the process, though not upon what might be properly termed a working scale, and very satisfactory results have been shown. A roasting mill has been equipped to give the process a thoroughly practical demonstration.

ELECTRICAL HEATING IN SWITZERLAND. The Maloja Kursaal on the Engadine is being heated electrically this winter by power derived from the Mera river in Aseima. There is no doubt that considerable use will be made of electric heaters in those cases where natural power is abundant, and it is probable that this department of electrical engineering will become exceedingly important in such cases.

STOCKTON ELECTRIC ROAD.—The directors of the Stockton electric street railroad have let the contract for constructing the proposed road to the Thompson-Houston Electric Company. The contract includes all the work upon the road from the laying of the rails to the building of the cars. The road is to be in running order by the 15th of July next.

MANGANINE, A NEW ALLOY.—Manganine is the name of a new alloy, consisting of copper, nickel and manganese, which has been brought on the market, says *Iron*, by a German firm, as a material of great resisting power. The resistance of manganine is higher than that of nickeline, which has heretofore passed as the best resisting metal. Another advantage of manganine is its behavior under variations of heat, the resistance, it is claimed, being affected only in a minute degree by high temperatures. It is therefore adapted for the manufacture of measuring instruments and electrical apparatus in general, which are required to vary their resistance as little as possible under different degrees of heat. A further interesting fact is that while other metals increase their resistance by the raising of the temperature, that of manganine is diminished.

OIL FIELDS.—A dispatch from Paso Robles, dated the 18th, says: Work has been commenced on the development of the oil fields discovered on Santa Rosa creek. The indications point to most favorable results. Petroleum exists in large deposits along the creek. The discovery promises to equal any of the oil fields of Southern California.

THE USE OF OIL AS FUEL seems to be slowly but surely gaining favor everywhere, both in Europe and this country. Trials have recently been made in some of the largest power plants in New England, which have shown both economy and efficiency in the new fuel.

STEAM BOILER NOTES

DRY STEAM.—There is no diversity of opinion among engineers in regard to the comparative value of wet and dry steam. Moist steam is sluggish and its elastic force is diminished in proportion to the moisture it contains. Moisture in steam is produced from the priming of the boiler, from condensation in long conveying pipes, from bad water and from forcing boilers. There is danger in moist steam from the water which it carries over into the cylinder, especially in these days of high speed and small clearances. To remedy this defect and danger, devices have been constructed to automatically effect a mechanical separation of the water from the steam, and it has been quite fully determined that such separation can be made. This matter has become a subject of so much importance that it was taken up, in June last, at Sibley College, Cornell University, and a competitive test made with the view of determining the best method of construction, operation, etc., to accomplish the desired result. The tests were made with steam carrying from 10 to 33 per cent of moisture. What is known as the Hine eliminator headed the test list by producing an average of 98.7 per cent of dry steam.

CUSHIONING.—A few years ago it was thought to be a nice little trick to cushion the bearings with soft wood, leather, or some such substance, to prevent an engine pounding, as with the bearings cushioned it would run much slacker without pounding, and consequently with no danger of heating, but the engineers who made use of this little scheme did not really give it away, as it was not considered to be "good engineering." Lately, we understand, the practice is becoming quite common on marine engines. Of course, a slight modification of the old practice is employed, but taken altogether, it amounts to the same thing, and really enables an engine to be run much looser in all the bearings and connections. In marine engineering there is some excuse for the practice, as with cushioned bearings and looser connections there is less friction to the engine, but more particularly, the engine can be driven harder with less danger of heating; but from a high engineering standpoint the practice is not commendable. —Stationary Engineer.

DON'T TURN EXHAUST STEAM INTO SEWERS, for such practice is both destructive to the sewer and dangerous to health. Hot steam causes slow disintegration and final collapse in a brick or cement sewer or chimney. In many places, and in this city as well, it is quite a common practice of engineers to turn the exhaust from pump or small engine into the sewers. It is bad practice, and, we believe, an illegal act in some cities, for it will not only destroy the sewers, but the heat of the steam makes the malarial gases more active, while at the same time it produces a certain amount of pressure that will force the gas back into the buildings through the water traps commonly in use. In these traps there is seldom more than three inches of water, and very little pressure is necessary to force the gas through them. Wherever gas is forced back through buildings in this or a similar manner, the death rate in that locality will certainly be greatly increased.

RAPID STEAMING BOILERS.—Recent improvements in boilers, especially those of the water-tube type such as are put into high-speed gunboats, torpedo boats, etc., show considerable increase in the power developed from a given weight of boiler and water over those formerly in use. A gunboat was recently equipped and furnished with a water-tube boiler in which all of the tubes were straight, and it supplies steam for the development of from 90 to 100-horse power per ton weight of boiler, including water, as reported after the test. A clear description of the boiler was not given, but if such power can be developed from such a weight of material, it shows an extremely high evaporative efficiency.

DON'T FORCE YOUR BOILER.—One very important cause of deterioration in boilers is due to the fact of their becoming too small, as work increases, to do the work without forcing, so that the pulsations of the engine cause a well-marked succession of shocks on the boiler, which result in the weakening of the material. By placing one's hand on the head or shell of the boiler, the vibrations of the metal can be felt similar to the rising and falling of a man's chest while breathing.

VOLATILITY OF GOLD.—Four pounds of gold were recently collected from the soot of the chimney of the Royal Mint in Berlin.



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W. B. EWER, SENIOR EDITOR

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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Water Wheels—James Lefel & Co., Springfield, O.
 Ore Concentrator—Adams & Carter.
 Steel Works—C. E. Pennington & Sons.
 American Exchange Hotel.
 Stamp Mill for Sale—W. H. Collins.
 Gates Patent—J. A. Gilbert, Jackson, Cal.

See Advertising Columns.

Passing Events.

Caminetti's bill for permitting hydraulic mining under certain conditions has been introduced in Congress, and advices from Washington indicate very good prospects of its passage this session. If that is the case, the mines can be started up without very much delay, as it will not take very long to put in the restraining dams.

The Employers' Association of this city is making strong efforts to put a stop to labor agitations, boycotts, etc., which have done so much to the detriment of the local manufacturing interests.

The organization of a large forge and gun company, in this city this week, is a very important industrial move. They propose to make guns, plates, armor, bars, shot and forgings, and conduct all business incident to such manufacture. It is intended to make all the steel needed, here, so that steel works will be put up. Arrangements have already been made for fuel and mine.

COLORADO's exhibit at the World's Fair will be largely mineral in character, and this feature, which will be made as complete as possible, will be shown in the mining building.

A Permanent Debris Commission.

On page 174 of this number of the PRESS is given the text of Caminetti's Hydraulic Mining bill, which provides for a permanent commission of three Government engineers, to be known as the California Debris Commission. Since the bill was drawn, a clause has been inserted providing for a tax of three per cent on gross output of all hydraulic mines benefited by the improvements created by the Government. The bill has been referred to a committee.

It seems that the Miners' Committee, now in Washington, found that if the miners did not object to a tax to pay for the necessary restraining works or dams, there would be much more likelihood of getting the proper legislation this session. They accordingly telegraphed the Executive Committee of the California Miners' Association, asking if it were probable the miners would agree to the following tax: One-fifth of one per cent on quartz mines, one-half of one per cent on drift mines, and three per cent gross product on hydraulic mines.

At the meeting of the Executive Committee, after considerable discussion, they resolved to answer that they did not favor a tax of any kind on quartz or drift mines, but would favor, if necessary, a tax of three per cent on hydraulic mines. Several very large owners in gravel property gave their opinion in favor of the proposition.

Messrs. Luttrell, Hobson, Searles and Caminetti called upon Secretary of War Elkins, Monday, and talked over matters pertaining to the improvement of California rivers and the resumption of hydraulic mining. Mr. Luttrell and the Secretary are old-time friends, and the latter was very willing and anxious to hear all that the Californians had to say on the subject, although he professed to have fair knowledge of these matters himself, having given them some attention. Mr. Luttrell says that the Secretary expressed himself heart and soul in favor of Congress doing something to revive California's once flourishing industry of hydraulic mining, if it can be done without injury to the navigation of rivers and of the farm lands situated along them. They also visited Chief of Engineers Casey, and laid before him a copy of Caminetti's bill. He has made some slight changes, and is in favor of its passage.

Before leaving for home, Robert T. Devlin wrote a letter to Judge Niles Searles of the Miners' Committee with reference to the mining bill. Among other things he said: "With some slight amendments which I have prepared and which I inclose, I think the bill represents the sentiments expressed in the miners' convention, and will be acceptable to the people affected by hydraulic mining in the past. These amendments provide—First, that it shall be the duty of the United States District Attorney to enforce the law and prevent persons mining by hydraulic process, except as provided for by said commission. Second—That provision shall be made for preserving the works erected by Government that they may not fall into ruin when no longer useful for mining purpose. Third—A declaration that nothing contained in the bill shall be so construed as to change law as determined by the courts.

Miners will do well to read the full text of the bill, which is very important to California.

THE HALE AND NORCROSS trial has been concluded. The defense thought to introduce evidence in rebuttal, but concluding not to do so, submitted its case on the testimony. Mr. Baggett, for the plaintiff, desired to amend his complaint to conform with the testimony, and to allege that Hobart and Hayward are principal stockholders and not owners of the Nevada mill; that the defense may not take advantage of that point in its argument; also, to amend so as

to state the probable damage that has resulted to the stockholders from the alleged conspiracy to defraud them between 1887 and 1889, through the milling of the Hale and Norcross ore. The motion on these amendments will be argued on the 10th and the arguments on the main case on the 14th before Judge Hebbard.

Comply with the Request.

It is greatly to be hoped that the request of the California Miners' Association will be complied with by individual hydraulic miners everywhere, and that no illicit mining will be carried on. By this is meant mining where injury is done to farming lands, or rivers, or where it is not carried on with the consent of the valley people. In some places, the conditions are such that the valley people do not object, and in such cases, of course, no harm is done.

The Miners' Association is working very hard to rehabilitate the hydraulic mining industry on a legal basis. If individuals, to get a few dollars, persist in disobeying court decrees, and continue to mine, they will embarrass the Association and do great harm to the whole cause. It is much better to wait patiently until the necessary steps are taken to restrain the debris properly. There has been factional strife enough over this question, and now that there is a chance of ending it, and letting the mining go on under agreed restrictions, it seems the height of foolishness to commit any act which will endanger the whole project.

Such miners as insist on having their own way in this matter, and selfishly pursue their own course, in defiance of public opinion and the wishes of their fellow workers, deserve no sympathy whatever if brought up with a round turn. They endanger the whole business. The Miners' Association has published broadcast an official request that illegal mining be stopped. The valley people realize the earnestness of the Association in this request. It ought to be respected everywhere. The hydraulic miners must stand or fall together this time, and the one who defies opinion and request, as well as what is really proper and right, is a traitor to the cause. He ought to be put under the ban by all decent men.

The California Miners' Association.

On Monday afternoon a meeting was held of the Executive Committee of the California Miners' Association.

A long letter from delegate J. B. Hobson, from headquarters at Washington, was read and gave much satisfaction. It stated that our Senators at Washington are both in favor of legislation and appropriations to allow the resumption of hydraulic mining, and will aid in every way. Our representatives are also working very hard for the general interests of the cause. R. T. Devlin and George Ohleyer are doing good work. John Hays Hammond, M. E., has been using his best efforts with acquaintances to further the purposes of the Association with great success.

A similar letter reporting good progress from Hon. J. K. Luttrell was read.

There was considerable discussion over the proposition to tax hydraulic mines three per cent of gross product for impounding works, but it was finally decided to approve the suggestion, as the committee in Congress was strongly of the opinion that it would aid matters at Washington.

The resignation of Henry Pichoir, as treasurer, was received, and the Crocker-Woolworth bank was selected as depository of the funds of the Association.

Robert McMurray, one of the delegates, left for Washington this week to join his colleagues.

THE outlook for the free coinage bill is much better in Congress than was reported last week.

Shasta County Miners.

A very enthusiastic miners' meeting was held at Redding, Shasta county, on Tuesday, and a County Association was organized. The officers are Judge Aaron Bell, Pres.; R. G. Hart, Vice-Pres.; Wm. G. Hobson, Sec'y, and Fred Grotefend, Treas. The Executive Committee is as follows: A. B. Paul, Col. C. J. Clark, J. Scranton, James Sallee, J. H. Morton, Wm. James and W. T. St. Auburn.

The proprietors of the newspapers of the county were made honorary members of the Association.

Upon motion, the Chair appointed the following Committees on Subscription and Membership: Redding—B. Conroy, John Bamber, L. S. Barnes. Igo—R. G. Harvey. Shasta—L. Garrecht. Old Diggins—Frank Young. Whiskeytown—Horace Green. French Gulch—Walter Van Matre. Anderson—A. W. Baker. Millville—Al Dunham. Squaw Creek—W. James. Copley—A. C. Ellis. Newtown and Buckeye—S. Stickley. Western Shasta—Tim Quinn.

The dues of the Association are 50 cents a month, the initiation fee being \$1. The body is to be known as the Miners' Association of Shasta County. The objects of the Association are as follows:

1. To bring into close and friendly relations the mining men of Shasta county.
2. To promote the mining interests of the county by directing the attention of capitalists to the immense and varied resources to be found in it.
3. To accumulate and preserve all records which may be of service to those seeking information in regard to our mining resources.
4. To provide a place of meeting where members may discuss questions of practical importance.
5. To keep on file various magazines and such periodical literature and newspapers as may be of interest to the members.
6. To endeavor to obtain just legislation in regard to titles to mining claims on railroad land and on other vexed questions which may arise.
7. That a library be formed and donations of books be solicited, works of reference being sought for or purchased, and that all the United States mining reports possible be obtained, and also those of different nations.
8. Also that a cabinet be formed which shall contain a standing exhibit of Shasta county ores.

CARNERO is an old camp in Colorado which is just now attracting attention again. It is about twenty miles from Del Norte, and will soon have a railroad. The camp was located in 1882 and a large number of prospectors were attracted to that locality by an extensive outcrop of porphyry all over the country, which was quite level. It was found by the summer's work that the locality was not favorable for the poor man, and the district was abandoned, except by one man, who located a hog ranch in the vicinity and has continued since 1883 sinking a shaft. Last summer he got down 250 feet and struck a lime contact, at which point he found a blanket vein of mineral eight feet in thickness. Tests were made, and it was found to contain gold and silver to the amount of \$300 and \$400 per ton. The ranchman kept his find secret until recently, while he secured several locations, and a few days ago allowed the conditions to be known. He took a party of prospectors to his barn, where he had about 100 sacks of ore from this mine. Flakes of gold were seen in the stuff and the party went wild, and the news brought from Del Norte is that the rush has commenced for the new camp.

THE San Francisco and San Mateo railway, the pioneer electric street railroad in this city, will make the first test of running its cars next week. The power house at Sunnyside has been completed. Wet weather has interfered with the construction of the switch from the main track into the car house. Otherwise, the entire road from Stuart and Market streets clear out to Sunnyside is finished.

Dumping Mine Cars.

In the PRESS of last week were given sketches of the "gunboats" of incline cars used at the Cross Creek Collieries for taking the coal from the bottom of the mine slope to the top of the breaker. The method of dumping these when they reach the top is as follows: The "gunboat" or car is so constructed that the back wheel has a much wider tread than the front. The rails from the bottom (2) (see engraving) continue to the dump at the top of the breaker, but at a point a little to the left of C. D. a second track commences, which is formed by an angle-iron (3 and 4) arranged in such a manner that, while the front

track is built; 13, eight-foot rope sheave; 29, floor of upper part of plane.

On gunboat: 9, front wheel; 10, back wheel; 11, front axle; 12, back axle; 17, clamp over spreader-bar; 18, head of swivel-pin to connect with rope; 19, spreader-bar (I-beam); 20, front pulling-bar; 21, pin in front of pulling-bar; 22, guide-strip to prevent pin (21) from striking; 23, back pulling-bar; 24, pin connection between stirrup and back pulling-bar 23; 25, stirrup for pulling-bars; 26, guide for pulling-bars; 27, wings on mouth of gunboat; 28, back pedestal.

On dump chute: 2, sides on chute bottom; 3, cast-iron chute plates; 4, web on chute platss; 5, I-beam supporting chute

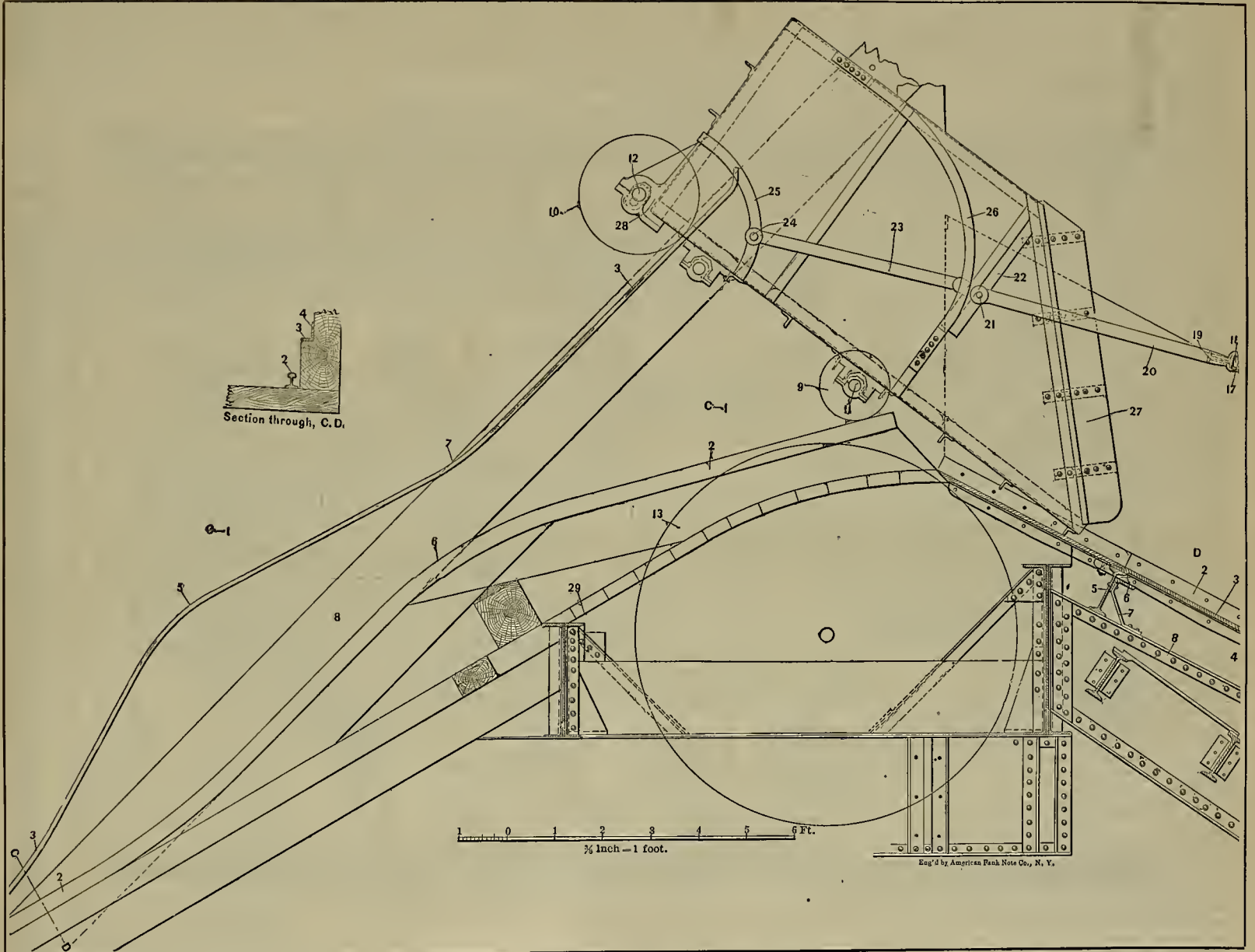
The Mechanical Engineers.

The members of the American Society of Mechanical Engineers who will visit this city in a body in May next are not merely people who can run a locomotive or stationary engine, but skilled professional men equipped to design or construct great engineering works. To be eligible as a member of this society, the candidate must have been so connected with certain professions as to be considered in the opinion of the council competent to take charge of work in his department, either as a designer or constructor, or else he must have been connected with the same as a teacher. Mechanical, civil, military, mining, metal-

to entertain the visitors at a banquet in the Guildhall. This in itself was an exceptional honor. In gracious response to an application to the Queen, Her Majesty directed that special facilities should be afforded for visits to Windsor Castle, including the private apartments, and to St. James and Buckingham Palace.

The Archbishop of Canterbury personally showed and explained the objects of interest in Lambeth Palace; while the Dean of Westminster delivered in the Abbey an address on the historical association of that building.

Among the purely social entertainments offered, were a garden party by the Baroness Burdett-Coutts, a reception by Lord Bras-



METHOD OF DUMPING MINE CARS AUTOMATICALLY.

whssl (9) can go through, the back wheel (10), with a much broader flange, is obliged to follow up this angle-iron. The result of this is, that the hind wheel (10) gradually rises, so that when the front wheel reaches the end of the track (2) the hind wheel is in the position shown in the figure, and the coal slides out itself without shock, the "gunboat" merely forming the prolongation of the dump. This is a very simple and convenient method of arranging the automatic dumping of loaded cars at mines.

By reference to the engraving, the details of the "gunboat dump" may be seen. The numbered parts are as follows: 2, rail for front wheel; 3, flat strap of iron upon which rear wheels of gunboat run; 4, flat iron strap to protect timber and act as guide; 5, second abrupt change in back wheel track; 6, abrupt change in front wheel track; 7, third abrupt change in back wheel track; 8, timber upon which the back wheel

plates; 6, angle-iron stiffener on I-beam; 7, brace for I-beam; 8, top flange of dump girders.

A DISPATCH from London says that it is now estimated that 460,000 miners will cease work in a fortnight in their efforts to prevent a reduction in wages. Should the present intentions of the miners be carried out and a strike inaugurated, this branch of the industries will be seriously affected, and it is estimated 1,000,000 men will feel the effects of the struggle. The price of coal is rapidly rising in London.

THE RIGHT SORT.—The Tidings says that every employe of the Idaho mine has joined the Nevada County Miners' Association. The employes of other mines should present a like record. To miners particularly, the present movement is fraught with interest.

Jurgical and naval engineers and architects may be candidates for membership. There are also associate members, who must have such a knowledge of or connection with applied science as qualify them to co-operate with engineers in the advancement of professional knowledge.

This society made a trip to England, France and Germany in 1889 and were very handsomely received and entertained by their professional brethren, especially in England. In London the party was formally received at the house of the Institution of Civil Engineers, by the President, Council and members when an address of welcome was presented, which was eloquently responded to by Professor Thurston—a name well-known to all engineers. On the evening of the same day the reception committee was, by the express sanction of the Lord Mayor, Alderman and Court of Common Council of the City of London, enabled

sey, K. C. B, associate member of the Institute of Civil Engineers, and a dramatic performance in the grounds of Copp'd Hall by invitation of Mr. S. B. Boulton associate member; while those members of the Civil Engineers Society who had facilities for doing so, vied with one another in their efforts to afford the visitors amusement and recreation during their six days stay in London as an organized party.

There were also visits to various engineering works and places of interest in and around London. Special trains were granted by the principal railway companies, and the entire party was escorted to Dover by a deputation of the Council of the Institution of Civil Engineers, when leaving for Paris.

It will be seen from this that wherever this society meets for its annual session it is received with distinguished honor. In San Francisco there will be no exception to this, and preparations are already being made for their entertainment. The party will leave New York on May 6th in a special Pullman train.

A Debris Bill.

The Hydraulic Mining Measure Before Congress.

A dispatch to the *Chronicle* from Washington, dated Feb. 27th, gives the following information:

The gentlemen who represent the miners and farmers of California have finally agreed upon a bill that is satisfactory to both sides, and will be introduced in the House at the first opportunity. It contains the principal features of both the Geary and Caminetti bills, but the proposition to assess the gross output of the mines, thus converting the appropriation into a mere loan from the Government, is omitted, and will not be inserted until the Miners' Association, the Executive Committee of which will meet in San Francisco on Monday, gives its assent.

The first section of the bill provides for a permanent commission, to be known as the California Debris Commission, consisting of three members. The second section describes the purposes of the Act as "First—To construct restraining and impounding dams, settling basins, relief canals and other works calculated to protect the navigable waterways and channels of the Sacramento and San Joaquin river systems from the encroachment of and damage from debris resulting from mining operations, natural erosion or other causes, and to permanently improve them. Second—To permit, on behalf of the United States, hydraulic mining on the tributaries of these rivers and the respective branches of such tributaries under the provisions of this Act; provided, that no injury or damage results to the navigable waterways and channels of the river systems."

The jurisdiction of the commission extends to mining on the tributaries of those rivers. The Secretary of War will designate three officers of the engineer corps of the army to constitute the commission within ten days after passage of the Act. The office of the commission is to be in San Francisco, and it will organize within 30 days after its appointment, when it will adopt rules of procedure for mine owners. The United States District Attorney of the northern district of California will advise the commission and institute all legal proceedings.

The duty of the commission will be to adopt plans to restore, as near as practicable and as the necessities of commerce demand, the navigability of the rivers to the condition existing in 1860. The bill also makes it the duty of the commission to determine the utility of storage sites in canyons and tributaries of the rivers or in plains, basins, sloughs, tule and swamp lands adjacent to them, for the storage of debris or water, or as settling reservoirs, with the object of using them to aid in the improvement and protection of navigable rivers by preventing the deposit therein of debris resulting from mining operations, or for affording relief thereto in flood time and providing sufficient water to maintain a scouring force in the summer season.

The commission will restrain, when appropriations therefor are made, by dams or other methods, all material lodged in the waterways and channels of the rivers and their tributaries, in order to better protect them, and will note from time to time, at the high and low stages of water, the amount of material carried in suspension, and will examine and estimate, from time to time, the amount of hydraulic mining carried on on each of the rivers, and will ascertain where the material so mined goes. In general, the commission will make a study of the hydraulic mining industry and devise methods whereby such mining may be carried on without injury to the navigable rivers. The commission will make annual reports, with plans of construction and estimates, which will, in turn, be transmitted to Congress.

The act gives a definition of hydraulic mining, and says that the owners of mining ground desiring to operate hydraulic mines shall file petitions, verified under oath, giving descriptions of the ground intended to be worked, the depth of the bank and the character of the material; the amount of earth to be moved, the quantity of water to be used, the number of monitors proposed to be employed, the character and extent of the dump, the distance from a navigable river, what facilities at the mine or elsewhere exist for impounding and restraining the debris, or settling the material carried in suspension after leaving the impounding dams or the point of discharge of the mine; what, if any, restraining impound works and settling reservoirs such owner proposes to build at his or its expense, of what material and at what place, also stating the capacity thereof. This petition shall be accompanied by plans and specifications of re-

straining and other works proposed to be built.

The owners of such mines shall surrender to the United States the right and privilege to regulate by law the manner in which the debris resulting from the working of the mines shall be disposed of. The surrender will in no way affect the right of the owners to operate the mines by any other process now in use. The use of common dumping sites is provided for.

After the petition is filed the commission will fix the date for a hearing, advertising it for ten days in San Francisco and Sacramento, and the law fixes the order of purchase in the hearings as to the introduction of testimony, contests, etc. In 30 days the commission will give a decision, which will be final, unless good cause for a rehearing is shown by the defeated party, and will then specify what works are to be constructed and how the operations shall proceed, having the protection of the owners always in view. When the works have been completed and approved by the engineers, permission to mine will be given, but first everything must be complete. In case of a joint petition for a common dumping site, the commission will decide the amount to be paid by each petitioner toward building the necessary restraining or impounding works.

In all cases where it is practicable, restraining and impounding works are to be provided by mine owners, near the mines before reaching the main tributaries of the navigable river. At no time will more debris be permitted to be washed away from any hydraulic mines than can be properly cared for at the mines or by the restraining works, or which, in the aggregate, will produce material to be carried in suspension in the rivers in excess of the carrying capacity of the current.

When necessary or advisable, the commission can modify any order granting privilege to mine by hydraulic process, and any violation of the order will be punished by forfeiture of the privilege. For the malicious destruction of any dams or other works, a penalty is provided of a fine not exceeding \$5000 or imprisonment for not less than five years, or both.

The commission can acquire by condemnation or purchase any land necessary for construction or storage, or for right of way, or to secure material, such as stone or timber. Public lands can be used by notifying the Commissioner of the Land Office, who will withdraw it from entry, and the use of ravines, water courses, storage sites, etc., is declared a public use. The commission can call on the Secretary of War or the Secretary of the Treasury, with his geodetic survey, for assistance at any time. When work is to be done, the commission will advertise for bids. If it is not done by contract, hired labor will be used. Under no circumstances will Chinese labor be tolerated.

The bill concludes by empowering the commission to proceed at once to build at available points above the head of navigation such impounding dams, settling reservoirs, canals, locks or other works as may be necessary to protect the rivers from debris already lodged in their tributaries, or which may lodge there hereafter. To do that the following appropriations are proposed: Stone dam, Rattlesnake Bar, American river, \$200,000; stone dam at Van Geisen's, Bear river, \$150,000; stone dam at Deugerec Point, Yuba river, \$300,000; dams and restraining banks on the Feather river, \$150,000; for the construction and completion at such place as the commission may deem fit of any restraining works, \$150,000; dams in the tributaries of the Sacramento, in the vicinity of Redding, \$30,000; other dams, \$40,000; stone dam on Sutter creek, above Lone City, \$20,000; dams on the Calaveras river, above Jenny Lind, \$30,000; for the use of the commission, immediately available, \$50,000.

This bill, which has just been finished by Mr. Caminetti, is thought to be the best that could be prepared, and it will probably be introduced on Monday.

Mr. Ohleyer reserves unqualified approval of the bill because he first wants to hear from his co-workers in the antidebris society.

From letters and telegrams received from the coast both Mr. Devlin and Mr. Ohleyer believe that some people there have mistaken the idea of their mission here. "We were sent here," said Mr. Devlin to-day, "by the Sacramento River Convention. This convention has had meetings in previous years, and has sent delegates to Washington to work for an appropriation for the improvement of the rivers. This is our sole errand here now. Our convention was held in December, and in January the miners held a convention in San Francisco, which we attended. At that convention a scheme was adopted by which hydra-

ulic mining could be resumed without damage to the farmers or impediment to navigation. Like good citizens, we favored this plan, as we would favor any plan that would add to our wealth and greatness without interfering with the rights of others.

"Shortly after our arrival here we appeared before the proper committee and made our arrangements and now have only to interview the individual members and try to get as much as possible in the bill to be introduced by the Rivers and Harbors Committee, which bill, I believe, is now being drawn up. A committee from the Miner's Convention followed us and we agreed to work together in harmony, that is, we will help them and they will help us. That does not mean that we have forgotten our original mission. We are here, first and last, to get an appropriation for our rivers. We are doing all we can to assist the miners' committee, but we will not tie ourselves up in any arrangement that would defeat our original object; that is, if the miners do not succeed in attaining their object we will not be so placed that we must fail, too.

"We want an appropriation and we will fight for it, no matter what Congress does with regard to hydraulic mining. Heretofore, when we have asked for money for river improvements, Congress has said: 'Why should we give you money to clear out your rivers when you immediately proceed to clog them up again?' and the appropriations have been refused. This year it is different. We can prove to them that hydraulic mining has been stopped, and, unless party policy interferes, we ought to get something; not as much as we ask for, but still something."

Assessment Notices.

KEYSTONE CONSOLIDATED MINING COMPANY.
Location of principal place of business, San Francisco, California. Location of works, Amador City, Amador Co., Cal. Notice is hereby given that at a meeting of the Board of Directors, held on Saturday, the 30th day of January, 1892, an assessment (No. 2) of Two Dollars and Fifty Cents (\$2.50) per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 310 Pine St., room 43, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 7th day of March, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made, the same will be sold on Monday, the 28th day of March, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.

By order of the Board of Directors.
J. E. ISHAM, Secretary.
Office, No. 310 Pine St., Room 43, San Francisco, Cal.

CALIFORNIA VERDE ANTIQUE MARBLE COMPANY.
Location of principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24 day of February, 1892, an assessment (No. 1) of One (1) cent per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin, to the Secretary, at the office of the Company, 308 Pine Street, San Francisco, California. Any Stock upon which this assessment shall remain unpaid on the seventh (7th) day of March, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the twenty-eighth (28) day of March, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
W. J. CURNETT, Secretary.
Office, 308 Pine Street, San Francisco, California.

DELINQUENT SALE NOTICE.

SAN FRANCISCO MILLING AND MINING COMPANY.
Location of principal place of business, San Francisco, California. Location of works, West Point, Calaveras County, California.

Notice—There are delinquent upon the following described stock, on account of Assessment (No. 1) levied on the 12th day of January, 1892, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
Williams, W. W., bal.	1	10 70	\$34 00
Barton, J. Q.	2	5 60	12 00
Field, A. J.	4	11 00	22 00
Mitchell, H. K.	5	50	1 00
Bateman, A. Tr.	9	300	6 00
Bateman, A. Tr.	10	300	5 00
Bateman, A. Tr.	11	300	5 00
Bateman, A. Tr.	12	100	2 00
Bateman, A. Tr.	13	100	2 00
Bateman, A. Tr.	15	50	1 00
Bateman, A. Tr.	16	250	5 00
Bateman, A. Tr.	17	250	5 00
Bateman, A. Tr.	18	250	5 00
Ecclleston, R.	20	500	10 00
Ecclleston, R.	21	500	10 00
Ecclleston, R.	22	500	10 00
Ecclleston, R.	23	500	10 00
Ecclleston, R.	24	500	10 00
Ecclleston, R.	25	500	10 00
Ecclleston, R.	26	500	10 00
Ecclleston, R.	27	500	10 00
Ecclleston, R.	28	500	10 00
Ecclleston, R.	29	500	10 00
Ecclleston, R.	30	500	10 00
Ecclleston, R.	31	500	10 00
Ecclleston, R.	32	500	10 00
Ecclleston, R.	33	500	10 00
Ecclleston, R.	34	400	8 00
Bateman, A.	35	1,800	36 00

And in accordance with law, and an order of the Board of Directors, made on the 12th day of January, 1892, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 55 Nevada Block, on TUESDAY, the eighth day of March, 1892, at the hour of two o'clock P. M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

CHAS. H. OSBORN, Secretary.
Office, Room 65, Nevada Block, 309 Montgomery Street, San Francisco, California.

FOR A NOTARY PUBLIC go to Lee D. Craig, No. 316 Montgomery St., S. F.

Dewey & Co.'s Scientific Press Patent Agency.

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A. T. DEWEY. W. B. EWER. OEO. H. STRONG.

DELINQUENT SALE NOTICE.

GRAY EAGLE MINING COMPANY.—LOCATION OF principal place of business, San Francisco, California. Location of works, Placer County, California.

Notice—There is delinquent upon the following described stock, on account of Assessment (No. 27) levied on the 11th day of January, 1892, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amt.
Jane A. Armstrong	582	105	\$ 6 30
A W Barrows, Trustee	554	700	42 00
A W Barrows, Trustee	555	271	16 26
A W Barrows, Trustee	501	500	30 00
A W Barrows, Trustee	563	500	30 00
A W Barrows, Trustee	564	500	30 00
A W Barrows, Trustee	568	1,000	60 00
A W Barrows, Trustee	571	100	6 00
A W Barrows, Trustee	573	100	6 00
A W Barrows, Trustee	599	500	30 00
A W Barrows, Trustee	600	300	15 00
A W Barrows, Trustee	607	500	30 00
A W Barrows, Trustee	610	500	30 00
A W Barrows, Trustee	611	500	30 00
A W Barrows, Trustee	617	100	6 00
A W Barrows, Trustee	618	100	6 00
A W Barrows, Trustee	619	100	6 00
A W Barrows, Trustee	630	100	6 00
A W Barrows, Trustee	621	110	6 00
A W Barrows, Trustee	623	300	15 00
A W Barrows, Trustee	622	500	30 00
A W Barrows, Trustee	645	1,040	62 10
A W Barrows, Trustee	656	500	30 00
A W Barrows, Trustee	653	100	6 00
J M Buffington, Trustee	495	500	30 00
J M Buffington, Trustee	503	4,475	268 50
J M Buffington, Trustee	522	1,040	62 10
J M Buffington, Trustee	612	1,100	65 00
O H Bogart, Trustee	443	1,000	60 00
O H Bogart, Trustee	449	1,000	60 00
O H Bogart, Trustee	450	1,000	60 00
O H Bogart, Trustee	451	1,000	60 00
O H Bogart, Trustee	483	105	6 30
E Brown, Trustee	267	100	6 00
E Brown, Trustee	312	550	30 00
E Brown, Trustee	338	115	30 00
Isaac Ethlinger	137	600	36 00
H L Francis, Trustee	591	1,100	66 00
W J Gurnett	630	21	1 26
T R Horton, Trustee	224	200	12 00
T R Horton, Trustee	398	1,000	60 00
T R Horton, Trustee	399	1,000	60 00
T R Horton, Trustee	400	1,000	60 00
T R Horton, Trustee	401	1,000	60 00
T R Horton, Trustee	402	1,000	60 00
Wm Leviston, Trustee	516	5,050	303 00
H M Rosebrans	39	500	30 00
C S Stout, Trustee	476	2,000	1 00
C S Stout, Trustee	477	953	57 18
Mrs M E Stout	170	500	30 00
Mrs M E Stout	188	100	6 00
W A Seales, Trustee	250	15 00	
W A Seales, Trustee	513	1,000	60 00
W A Seales, Trustee	542	100	6 00
W A Seales, Trustee	543	100	6 00
E S Shanklin, Trustee	643	400	24 00

And in accordance with law, and an order of the Board of Directors, made on the 11th day of January, 1892, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 11, No. 303 California street, San Francisco, California, on MONDAY, the seventh (7) day of March, 1892, at the hour of one o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

A. W. BARROWS, Secretary.
Office, Room 11, No. 303 California street, San Francisco, California.

W. H. CONLY, Mining, Commission.

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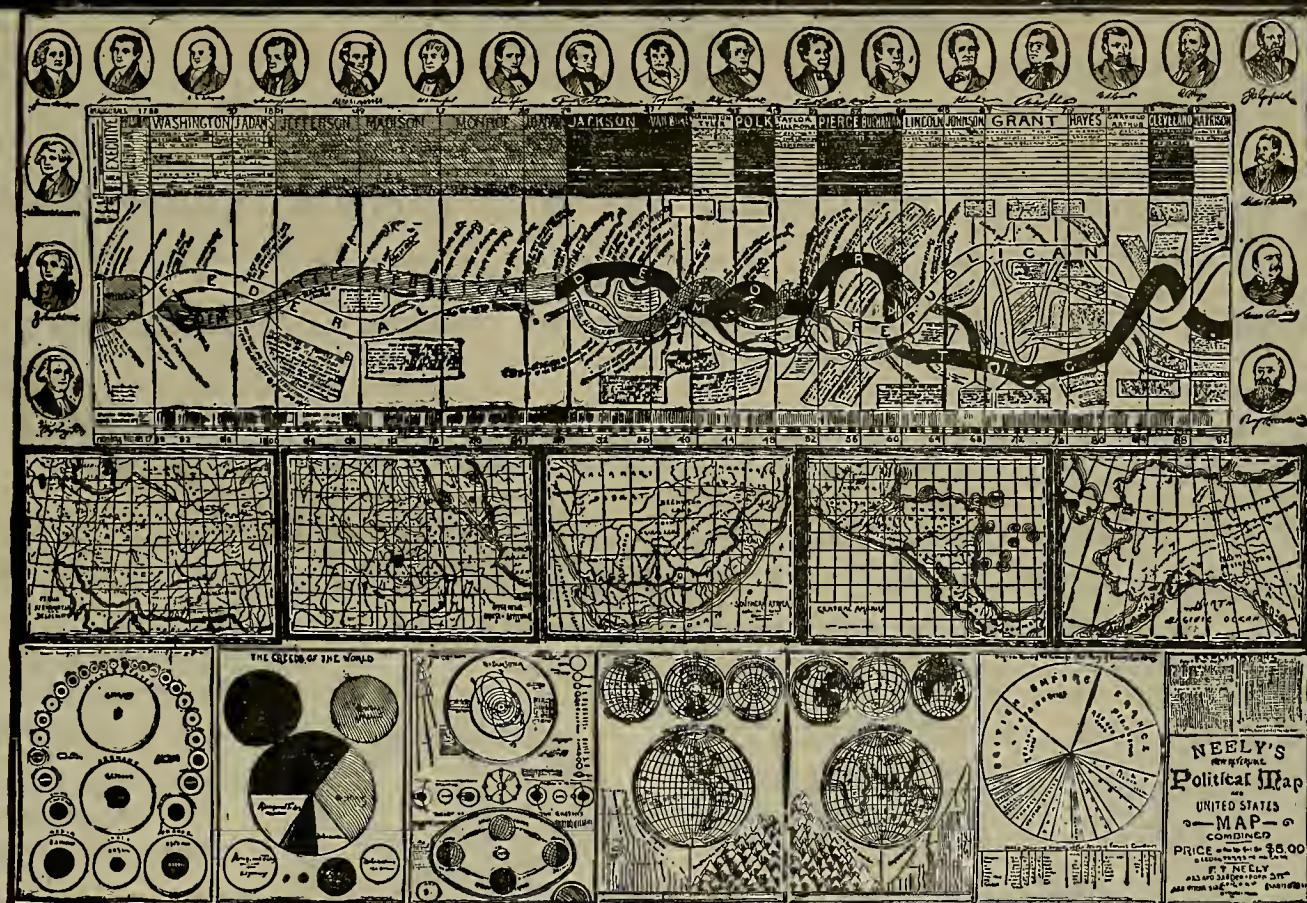
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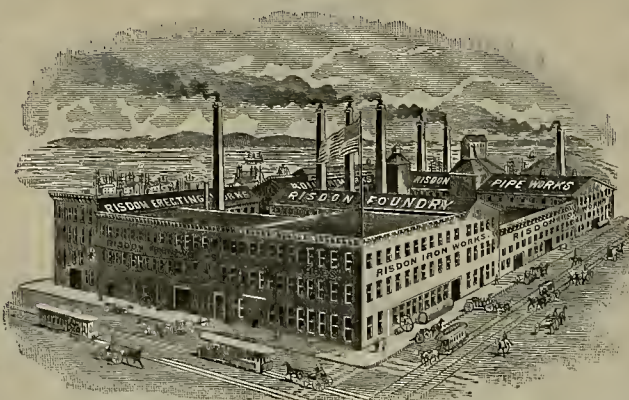
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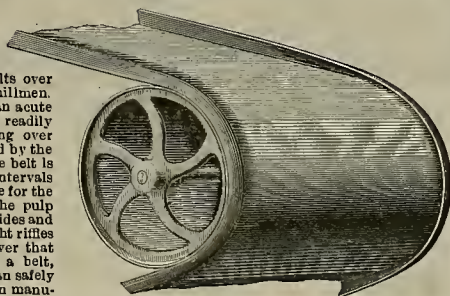
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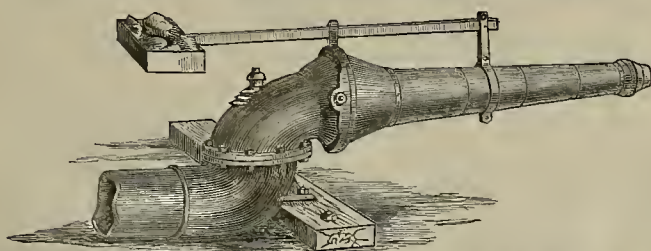
We have now made arrangements to have our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight rifflings also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better belt than has ever been manufactured for use on this coast. It will last much longer and will handle fully one-third more pulp than any smooth belt, and will save a higher percentage of sulphurets.

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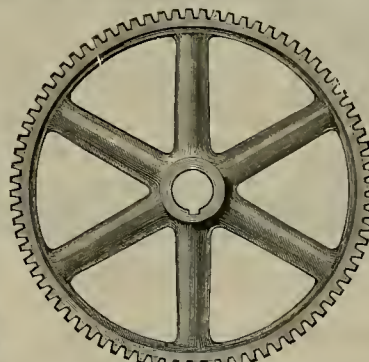


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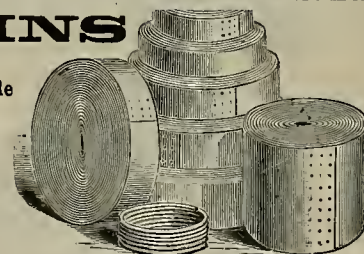
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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING FEB. 23, 1892.

- 469,223.—CAR COUPLING—E. Bowch, Los Angeles, Cal.
- 469,512.—PULLEY—W. F. Buswell, S. F.
- 469,543.—GANG EDGER—F. W. Cook, S. F.
- 469,549.—LEIBER AND SALES BOOK—J. E. Depue, Oakland, Cal.
- 469,550.—STONING KNIFE—F. H. Disbrow, Glendora, Cal.
- 469,551.—STREET SWEEPER—P. B. Donahoo, Fresno, Cal.
- 469,559.—AUTOMATIC FUNNEL CUT-OFF—J. H. Driller, Los Angeles, Cal.
- 469,346.—SAFETY DEVICE FOR ELEVATORS—Thos. Fuller, Angels, Cal.
- 469,566.—AMALGAMATOR—J. H. Hawthorn-thwaite, S. F.
- 469,247.—BED-COVERING—W. Holder, Mokelumne Hill, Cal.
- 469,252.—SEED CLEANER—R. W. Jessup, Alameda, Cal.
- 469,580.—WHEEL WRENCH—M. Marshall, Walla Walla, Wash.
- 469,585.—HYDRAULIC ELEVATOR—A. J. McAdam, S. F.
- 469,589.—HYDRAULIC MOTOR—J. W. Pack, S. F.
- 469,594.—INITIALER—J. A. Perou, Paris, Cal.
- 469,306.—MOTOR—John Sands, Seattle, Wash.
- 469,280.—ELECTRIC RAILWAY—W. S. Smith, Berkeley, Cal.
- 469,613.—NUT LOCK—C. O. Viuyard, Navajo Springs, A. T.
- 469,618.—PROPELLER BLADE—D. H. Welch, Astoria, Or.

The following brief list by telegraph, for March 1, will appear more complete on receipt of mail advices:

California.—Matthew Ulmeyer, Oakland, feed mechanism for nail machines and nail-rolling machinery; Matthew Arnold, San Francisco, riveting machine; William N. Best, Los Angeles, portable lawn fountain; E. Chauquette, San Francisco, machine for upsetting tires; Robert Dows, Modesto, combined wash bench and wringer; Henry A. Dehl, San Francisco, production and manufacture of pure asphaltum, etc., from natural asphalt; David Darwood, San Francisco, tubular metallic pail; Julius Fluck, San Francisco, cash and package carrier; James W. Graves, Lathrop, punch, Henry & Lase, San Francisco, filtering faucet; Charles E. Newell, San Francisco, can-labeling machine; same, automatic fountain for pasting machines; same, can-labeling device; Willis H. Ostrander, Merced, magazine shotgun; William S. Phelps, San Francisco, rail-fastening device; Charles A. Sparks, Sacramento, hoop or band fastener and tightener; Alfred Taylor, San Francisco, hydraulic pump extensor; Julius Wiesendler, San Francisco, purifying illuminating gas; Oregon—Charles J. Dante, Hillsborough, wood-splitting machine; M. E. Heacock and T. H. Lovejoy, Portland, car; Evan W. Jones, Portland, boiler or other furnace (2); Bradford Lane, Carlton, earth auger. Arizona—De Witt B. Williams, Prescott, car.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail, for telegraphic orders. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

STREET SWEEPER.—Peter B. Donahoo, Fresno. No. 469,551. Dated Feb. 23, 1892. This is an improved apparatus for sweeping streets and collecting dust and dirt therefrom. The invention is designed to sweep the dust from the streets, to elevate it by continuously acting buckets, and to deliver it into a receptacle carried upon the machine, by a single continuous operation.

HYDRAULIC ELEVATOR.—Alexander J. McAdam, S. F. No. 469,585. Dated Feb. 23, 1892. This is one of that class of hydraulic elevators in which the pressure of the water is directed upon oppositely moving parts which are connected together, whereby they move in unison, and are also connected with the cage or car to effect its travel. The invention consists in telescopic cylinders moving in opposite directions, said cylinders having beavies over which the hoisting ropes pass. It also consists in connection with said cylinders of the telescopic or extensible water pipes, by which water under pressure is supplied to the cylinders and exhausted therefrom; and it finally consists in the combination of said cylinders and the connecting chains by which they are enabled to move in unison.

HYDRAULIC MOTOR.—John W. Pack, S. F. No. 469,589. Dated Feb. 23, 1892. This is a water wheel designed for the propulsion of small machinery. It consists of a case of peculiar shape having a supply pipe extending centrally and axially through one end, an enlarged head having a step in the center of the end within the case, tubes or passages upon the sides of said head through which water is delivered, and in combination with this of a peculiarly shaped wheel consisting of a disk with curved buckets projecting from one face of it and surrounding the perforated head of the supply pipe, the shaft of said wheel extending through the opposite end of the case without packing and having its opposite end turning on an adjustable bearing. This simple little wheel is intended for driving sewing machines, etc., with the pressure from the city mains. It is very small and compact and is neat in appearance.

GANG-EDGER.—Frederick W. Cook, S. F., assignor to Frank P. H. Loftis, No. 469,543. Dated Feb. 23, 1892. This is one of that class of ma-

chines for cutting lumber into strips and usually known as "gang-edgers." The invention consists in the novel shifting mechanism for properly adjusting the saws and in the novel means for adjusting the feed-rolls. The general object of the invention is to provide a gang-edger, the shifting mechanism of which is simple, effective and accurate, and is not liable to bind or cramp in operation.

Mining Share Market.

SAN FRANCISCO, March 3, 1892.

The monotony of a continued inactive mining share market is semioccasionally relieved by inside cross orders. While this condition obtains, yet there is a well-grounded belief that stocks are being slowly but surely absorbed. For whom are the purchases made? In an open question, as to what for what purpose are the shares being taken in? Although everything points to stocks being concentrated, yet the writer has seen prices go quite low before a bona fide upmove sets in, as often as he has seen them go up on purchases.

Old and experienced mining men assert that the Comstock mines were never before in so good condition for successful mining, under the present system of working the mines and milling ore, or for paying dividends, with a change of management, so as to have the laws conformed to, under which the companies incorporated. Until honesty obtains in the working of the mines and in the milling of ore, outsiders had best fight, but outside shareholders pull in their horns to insiders and assessments to outsiders.

Mine managers have heretofore acted as if they were above the law, and that all judges are purchasable, but the suit against the directors of the Hale & Norcross Mining Co. must be convincing evidence that one Judge, at least, is not to be corrupted, and that juggling with laws is an unsafe game. Managers of the mill, through the aid of writers, cappers, camp followers and tools, are doing all in their power to create an unfavorable opinion against the Brokers' Combine, so as to thwart any move looking to outsiders acting more in concert, by which a better protection of their rights can be secured. The stock pools and mill rings are well organized and act in concert, but outside shareholders pull in every direction, and by not acting more in concert, they are incessantly slaughtered. In union there is strength, and it is the Brokers' Combine that offers the opportunity of joining force to successfully fight inside rings.

The Mining Stock Association fighting the mill rings on the mines, and the Brokers' Combine fighting the stock pools on the stocks, look very much like business. It is the first time within the history of the Comstock mines that insiders have been fought in such a way.

It is the generally accepted opinion that R. F. Morrow has been, and still is, manipulating the stock market in the interest of D. O. Mills, Francis G. Newland and the Sharon heirs. If this is the case, then it relieves others of the odium, in which they are held by many.

John W. Mackey, under oath, stated that car sample assays were a check against the rapacity of mill owners. This being his opinion, derived from actual experience, why does not the superintendent of Con. Virginia give the car sample assays? Not giving them confirms the many in the belief that there is an annex to the mill which reduces the ore.

The mining share market opened strong this morning, with an advance in quotations for Ophir and Mexican. The Gold Hill shares were lower and weak, while the Middles were barely steady. The market ought to do better, yet outside operators who took the market have been far better than it for other persons that have beaten the game.

Ever since the change in one of the Directors of the Quibota mines, prices for these asses-ed-racked stocks have been steadily declining, until they range lower than ever before. The Bodie and Razor Blade shares have ruled dull, with the latter selling lower owing to an assessment scare. Our correspondent who wants to know what has become of the money received from the sale of ore extracted from the Tuscarora mines, is informed that no one appears to know.

News from the Comstock mines continues uniformly good. It is an undeniable fact that the managers of several of the mines are developing the rich gold-bearing west lead, but whether for looking or not it is hard to say. It now looks as if the developments in the Hale and Norcross suit have disconcerted them, and possibly they may conclude to throw a few crumbs to outside shareholders. In Mexican the strike reported last week is said to be looking better. In Ophir they are playing around the body ore reported by the assayers some months ago. In Consolidated Virginia they have the rich ore lying to the west so far developed that Mr. Mackey can, if he desires, run into it on his return to this coast. Of course it will be through and by his superior knowledge as a miner that it is done, if it be done at all. It is said that important secret work is being done in Gould and in the Bodie, but for that matter, for that there is hardly a mine in the Comstock but what this is being done in. It looks as if they will soon be ready to show up the ore in one or two of the Gold Hill mines, but perhaps it will be necessary to levy and collect more assessments first. The Alta group of mines, it is claimed, will soon be ready for looking. The Bodie mill has stopped running on Bulwer ore and will start up on Bodie ore. The Bulwer superintendent has remitted to the office in this city over \$16,000, with the final cleanup to hear from.

THE SALTON LAKE.—A dispatch from Salton, San Diego county, says: From present indications the desert lake here will be much larger than last year. At present the lake is about half a mile wide, and after running along the Southern Pacific track for about two miles, extends off out of sight to the south. At this time last year there was not a drop of water visible, although there was a quantity a few inches below the surface of the sink. It was not until several months later that the floods occurred in the Gila and Colorado rivers, caused by melting snows, and it was only in August that the water in the Salton sink began to attract attract attention. The snow in the mountains at present is heavier than for years, and coming, as the water will when it melts, on land already in a large part saturated, a lake of unexampled extent will probably be created. Old residents believe that about 100 miles of the track of the Southern Pacific, which lies in the desert below the sea level, will be overflowed.

A VESSEL brought 930 tons of Alabama iron to this port this week, the first large shipment to this coast from that source.

The California Miners' Association.

Officers, Committees and Constitution and By-Laws of the State Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized. The officers of the Association are as follows:

HON. J. H. NEFF.....President.
W. C. RALSTON.....Secretary.
THOS. B. EVERETT.....Ass't Secretary.
H. PICHOLE.....Treasurer.

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J. F. Ryan.....	Humboldt
Aaron Bell.....	Shasta
H. O. Harvey.....	Sacramento
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A. M. Hardie.....	San Luis Obispo
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Ex-Gov. H. G. Blaisdell.....	Alameda
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I. C. Stump.....	San Francisco
C. T. Lacy.....	San Francisco
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John W. Maxwell.....	Tuolumne
Hon. R. Clark.....	Colusa
C. F. Reed.....	Placer
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James H. Lawrence.....	Merced

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Wm. Ireland Jr., S. F.	S. K. Thornton, S. F.
N. J. Brittan, San Mateo.	John Hays Hammond, S. F.

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vada.	H. I. Thornton, S. F.
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Hon. Niles Searies, of Nevada County	
Hon. J. K. Luttrell, of Nevada County.	
Robert McMurray, of Nevada County.	
J. B. Hobson, of Placer County.	

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

SEC. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of this organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of seven members selected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

SEC. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

SEC. 3. The President and Secretary of the Association shall be ex officio President and Secretary of the Executive Committee.

SEC. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of the Association.

SEC. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein proscribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

SEC. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall ren annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

SEC. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by the President and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of the Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at the city and county of San Francisco.

SEC. 2. It shall be the duty of the Vice-Presidents of this Association to at once proceed to the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

SEC. 3. All persons friendly to the mining interests are eligible to become members of this Association. In the event that there is no County Organization, such person may unite with the State Association by forwarding his name to the Secretary thereof, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

SEC. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected as such County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by the Executive Committee, Jan. 22, 1892.

BY LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittee as they may determine. They shall fill all vacancies of the officers of the Association or members of any committee. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

SEC. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of the annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

SEC. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

SEC. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

SEC. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

SEC. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of such intended meeting.

SEC. VII.—The Secretary and Treasurer shall receive such compensation for their services as the Executive Committee may, from time to time, determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22d, 1892.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F., Stock Exchange Building.

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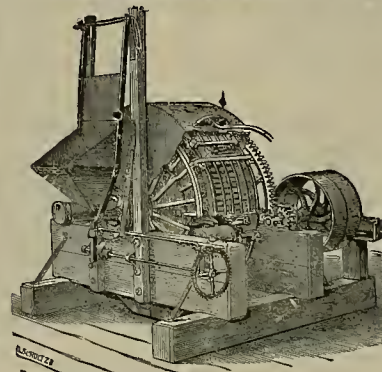
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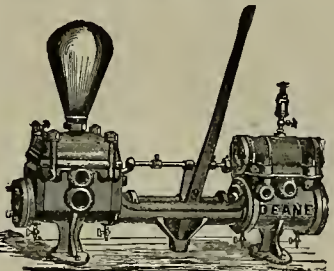
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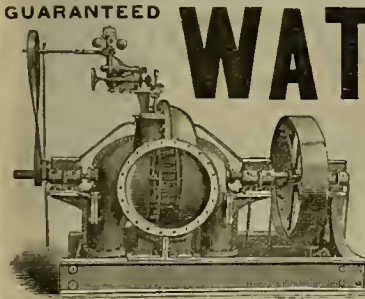
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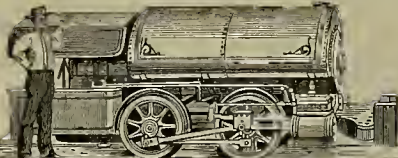


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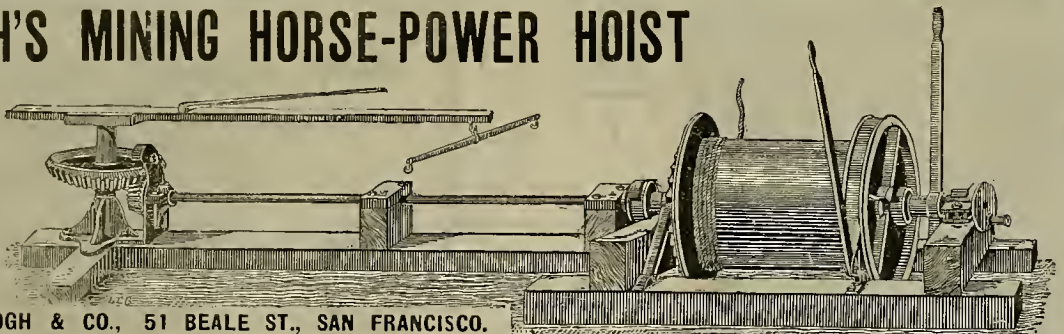
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 3, 1892.

General trade continues only moderately fair, but confidence is expressed in more active times within the near future, the only decided drawback being the extortionate rates of freight at points on this coast demanding the use of a railroad company. It is this persistent high freight charges which kills the goose that lays the golden egg. It is the generally accepted opinion, probably derived from actual experience, that freights from this city to many local points are as high as they are from the East. Under this condition, how is it to be expected that our merchants, manufacturers and iron workers can successfully compete against the East, with its cheaper labor and lower-priced raw material?

General rains the past week dispels, for the time being at least, all fears regarding the crops, while additional snow deposits on mountain ranges emphasize the favorable prospect for an abundant supply of water during the summer months for both irrigation and mining purposes. The outlook for a large wheat crop gives promise of cheap coals, pig iron, etc., which will add largely to the interest of our iron workers.

The local money market continues easy, with a generally accepted opinion that after next week the rates of interest will largely favor borrowers on gilt-edged security. At the East, a seemingly temporary demand for gold is casting a shadow over the financial horizon, but as the fears are probably exaggerated, a reaction for the better ought to soon set in. For the year ending February 29th, gold exports have been \$2,561,922, and imports \$2,018,755. The exports of silver in the week were \$732,637, and the imports \$79,659. For the year the silver exports have been \$3,810,639, and the imports \$248,412. For the week ending Feb. 29th, the gold exports aggregated \$2,600,000. The large exports of gold in the last half of February is accepted as due to the selling of American stocks and bonds by foreigners desirous to take advantage of the high premium ruling for gold. The New York *Mail and Express*, Feb. 26th, says that "in connection with the current outflow of the precious metal it can be stated that a prominent drawer of sterling bills on yesterday received a bid from London of 75 3/4 pence for American gold, but declined it for the reason that there was no inducement to make the transaction at the then ruling rate of exchange. To-day it was reported that the German banks were paying more for gold than the Bank of England, and the fact that all the shipments thus far have been to the continent, gives color to this report."

MEXICAN DOLLARS—The market is barely steady at around 7 1/2 cts. The steamer *Belgie* left the past week for China. She took out 224,524 dollars for Hong Kong and 40,000 dollars for Yokohama.

QUICKSILVER—Receipts the past week aggregated 618 flasks and exports by sea two flasks to Mexico. The market has a stronger tone with an early advance in prices not at all unlikely.

SILVER—The market has every appearance of grounding around bottom; if this proves to be the case then it is only reasonable to look for much higher prices before the Spring months pass. The news from Washington is more favorable to the passage of a free coinage bill. It is altogether probable that if such a bill should be passed, President Harrison will sign it. There are several reasons why he will probably sign the bill, not the least of which is that by so doing he takes the silver question as an issue out of the presidential election. The growing sentiment abroad in favor of bimetalism and a desire expressed by the gold countries to have an international convention looking to favorable action on the subject, removes one of the only stumbling blocks in the way of the passage of the free coinage bill in this country. The advancing premium paid for gold by European countries forces the conviction that the supply is inadequate to the world's requirement which will force silver to the front to supply the deficiency. At the time the present law compelling the mint to purchase 4,500,000 ounces of silver bullion a month went into effect the writer took occasion to say it would prove a failure, owing to there being no provision requiring its coinage and being stored it would prove a menace to the market and drive silver value to low prices. This position time has verified to be correct. Writing on this subject the last London *Economist* to hand says: "The fear that the United States is drifting into monetary difficulties has already disorganized the silver market, which is kept in a chronic state of apprehension lest the Treasury should be compelled to dispose of a portion of the enormous stock of the metal it has accumulated. That is the root cause of the extreme weakness of the silver market, and it is a menace also to the stability of the money market, since it is impossible to say to what devices the United States Treasury may be forced to have recourse in its efforts to maintain the parity between gold and silver."

The steamer *Belgie* for Hong Kong took out \$46,000 of silver bullion from this port.

LIME—Receipts the past week aggregated 3563 bbls. The market is barely steady. Continued low prices ruling for cement cuts off quite a demand from builders.

ANTIMONY—The market is weaker. New York mail advices quote as follows on wholesale quantities: 11 cts. for Hallett's, 12 1/2 cts. for 13 cts. for LX, and 15 cts. for 15 1/2 cts. for Cookson's.

PIG IRON—Imports the past week aggregated as follows: Liverpool 314 tons, Swansea 379, Baltimore 937, total 1630 tons. That received from Baltimore comes from Alabama, and is, as far as we can learn, the first consignment of pig iron received at this port from the South. This shipment is to be followed by others, for it is said that 4000 tons have been sold to the following foundries: Atlas, Fulton, National, Risdon and Union Iron Works and Steiger & Kerr. The iron is said to be both softer and stronger than the ordinary run of pig iron from Pennsylvania. A contemporary says: "It is claimed that pig iron is selling at the furnaces in Alabama as cheaply as at the furnaces in Scotland. It costs \$5.15 to freight the iron from the mines to New York and \$3.00 from that port. It can be sent to Mobile or Charleston for 95¢ per ton, and if vessels could be induced to load at either of those ports for San Francisco as cheaply as at New York, the cost of carriage would not exceed \$9, which is less than freight and duty from Scotland." The local market is weak and irregular. The prospects for a large wheat crop unsettle values for parcels in all positions.

TIN—Imports the past week aggregated 67,994 boxes of plate from Liverpool. The market is dull and heavy, owing to canners being well-supplied for their near-by wants.

LEAD—The market is more or less unsettled. The East reports that the firmness there is due to labor troubles at the mines in the Idaho dist. Outside of this, the influences on the market are against the selling interest.

COPPER—The market has shaded to a still lower range. Iron Age reports that the "Annet and Hecla Company have recently taken orders for about 100,000 lbs. of Lake Superior ingot at 10 1/2¢ for March and later delivery. The English market is still under speculative influence, with the bears in the ascendency.

COKE—The market is barely steady, notwithstanding a free consumption.

COAL—Imports the past week aggregated as follows:

Tacoma 5200 tons, Comox, 4150, Newcastle (N. S. W.) 1403, Liverpool 9224, Nanaimo 5550, Sydney 2520, Baltimore 1830, Swansea 5563; total 35,447. The market for spot is weak, we might say somewhat demoralized, with correct quotations very hard to obtain. The consumption shows a falling off in household coals and also in coals used by steam vessels in harbor. The railroad consumption is also higher. With the incoming crops, the steam and railroad demand will probably be larger than ever before. For shipments, buyers are offish, unless offered concessions. Improved crop prospects are the prime factor in creating a conservative spirit with buyers.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.	@ 14 1/2	English, lb.	@ 20
Refined, in car lots 8 @		Canlon tool	@ 9
Powdered, do.	8 @	Pick & Hammer.	@ 10
Concentrated, do.	7 1/2 @	Machinery	@ 6
All grades jobbing at advance.		Tool Calk	@ 4 1/2
COPPER.		TIN PLATE.	
Sold.	22 @	S. V. steel grade	@ 6 00
Sheathing.	22 @	14x20, spot.	@ 6 00
Ingot, jobbing.	24 @	Charcoal, 14x20.	@ 6 00
Do, wholesale.	24 @	Do roofing, 14x20.	@ 12 00
Fire Box Sheets.	22 @	Do, do, 30x32.	@ 12 00
IRON.		PIG TIN.	
Bar, base.	3 @	Spot, lb. irreg.	@ 21
Norway, base.	4 1/2 @	ular, nominal.	@ 21
SPOT FROM LARD—PER TON.		SPOT FROM LARD—PER TON.	
Eglington ton.	26 00	Wellington.	\$8 00
Glenaroch.	26 00	Greta.	7 25
Am. Soft. No. 1.	25 00	Nanaimo.	7 25
Oregon Pig.	30 00	Glasgow.	6 00
Puget Sound.	30 00	Seattle.	6 00
Clay Lane White.	25 00	Coots Bay.	6 00
Shotts, No. 1.	26 00	Chabell.	5 50
Langlois.	26 00	Egg, hard.	15 00
Thorndike.	26 50	Cumberland, in sacks.	15 00
Gartbarrie.	26 50	Do, bulk.	14 00
Barrow.	26 00	Walsend.	7 50
Carbeck.	24 00	Scotch Split.	8 00
CHROME IRON ORE.		COAL.	
Perton.	10 00 @	West Hartley.	7 25
LEAD.		TO LOAD—PER TON.	
Pig.	4 1/2 @	Australian.	\$ 7 00
Bar.	5 @	Liverpool Steam.	7 00
Sheet.	7 1/2 @	Rymbo.	7 50 @
Pipe.	6 1/2 @	Cardiff.	7 25 @
SHOT.		LEIGH LUMP.	
(Discount 10% on 500 ha.)		Cumberland.	@ 13 00
Drop.	1 1/2 @	Egg, hard.	12 00 @
Suck.	2 1/2 @	West Hartley.	@ 7 50
Chilled.	2 3/4 @	COKE.	
QUICKSILVER.		English, to load.	\$9 00 @
Home trade, pr.	43 00 @	Do, spot, in bulk.	11 00 @
For export.	@ 33 00	Do, in sacks.	13 00 @

Eastern Metal Markets.

NEW YORK, March 3.—The following are the closing prices the past week:

	Silver in New York.	Copper.	Lead.	Tin.
Thursday.	91 1/2	10 7/8	4 20	19 50
Friday.	91 1/2	10 65	4 20	19 55
Saturday.	91 1/2	10 60	4 20	19 50
Sunday.	91 1/2	10 60	4 20	19 50
Monday.	91 1/2	10 60	4 20	19 50
Tuesday.	91 1/2	10 60	4 20	19 50
Wednesday.	91 1/2	10 60	4 20	19 50

NEW YORK, March 2.—Pig iron is in good demand, but prices still favor buyers. Borax is steady. Antimony is easy. Tin is slightly firm in sympathy with silver. Copper is barely steady. Lead is steady. Quicksilver is firmer with a disposition to advance prices.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 11.	WEEK ENDING Feb. 18.	WEEK ENDING Feb. 25.	WEEK ENDING March 2.
Alpha. ....	.50	.55	.55	.35
Alta. ....	.15	.15	.15	.15
Andes. ....	.70	.75	.75	.60
Belcher.	1.40	1.80	1.20	1.00
Belle Isle. ....	.30	.25	.30	.25
Best & Belcher.	2.50	3.25	2.50	2.25
Butte.	1.15	1.25	1.10	.75
Bodie. ....	.60	.55	.65	.50
Bulwer. ....	.50	.45	.50	.40
Commonwealth. ....	.20	.20	.25	.15
Con. Va. & Cal.	5.25	6.25	5.75	4.10
Challenge. ....	.80	.75	.80	.75
Chollar.	1.25	1.80	1.50	1.25
Confidence.	2.50	2.60	2.75	2.85
Con. Imperial. ....	.10	.05	.05	.10
Corral. ....	.30	.30	.30	.25
Crocker.	1.35	1.55	1.25	1.45
Del Monte. ....	.75	.80	.80	.50
Eureka. ....	.15	.20	.15	.15
Eschsch. ....	.15	.20	.15	.15
Grand Prize. ....	.10	.10	.10	.05
Gould & Curry.	1.20	1.85	1.50	1.20
Hale & Norcross.	1.95	3.00	1.85	2.90
Julia. ....	.55	.65	.15	.10
Justice. ....	.20	.20	.25	.15
Kentuck. ....	.20	.30	.25	.20
Lady Wash. ....	.20	.30	.25	.20
Mono. ....	.80	1.00	1.10	.85
Mexican.	1.50	2.15	2.00	1.50
Narajo. ....	.10	.10	.05	.05
North Belle Isle. ....	.25	.20	.25	.15
Nov. Queen. ....	.30	.45	.25	.30
Occidental. ....	.20	.35	.60	.40
Ophir.	2.85	3.50	2.85	2.85
Overman. ....	.95	1.15	.90	.55
Potosi.	1.75	1.90	1.65	1.75
Peerless. ....	.10	.10	.05	.05
Peru. ....	.10	.05	.10	.15
Savage.	1.25	1.50	1.25	1.15
S. B. & M. ....	.55	.60	.55	.30
Sierra Nevada.	1.55	1.80	1.50	1.55
Silver Hill. ....	.15	.15	.10	.10
Southern. ....	.25	.20	.15	.10
Union.	1.45	1.85	1.60	1.70
Utah.40	.45	.35	.30
Yellow Jacket.	1.00	1.20	.90	1.05

* Assessment added.

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COMPANY AND LOCATION.	NO. AMT. LEVIED, DELINQ. AND SALE.	SECRETARY.
Alki Cons M Co, California.	2. 1c. Jan 16, Feb 20, Mar 9.	R B Keeler, Pelian Block
Butte Queen M Co, California.	2. 4c. Jan 26, Feb 27, Mar 28.	V Gadsden, 119 Busb
Cal Verde Antique Marble Co, California.	2. 1c. Feb 2, Mar 7, Mar 28.	W J Gurnett, 331 Pine
Challenge Con M Co, Nevada.	1. 2c. Jan 14, Feb 17, March 3.	O L Elliott, 303 Montgomery
Chollar M Co, Nevada.	32. 50c. Jan 8, Feb 11, March 3.	C E Elliott, 303 Montgomery
Con Imperial M Co, Nevada.	33. 3c. Jan 22, Feb 25, Mar 15.	O L McCoy, 331 Pine
Evening Star M Co, California.	3. 4c. Jan 20, Feb 22, Mar 12.	J J Scoville, 320 Sansome
Excelsior M Co, Nevada.	32. 25c. Jan 22, Feb 25, Mar 17.	C E Elliott, 303 Montgomery
Fall River Con M Co, California.	7. 2c. Jan 8, Feb 11, March 12.	L Ross, 126 Sutter
Golden Fleece Gravel M Co, California.	16. \$1.00. Jan 19, Feb 24, Mar 17.	J W Pew, 310 Pine
Gould & Curry M Co, Nevada.	68. 3c. Jan 8, Feb 8, March 1.	A K Durbrow, 309 Montgomery
Gray Eagle M Co, California.	1. 2c. Jan 11, Feb 15, March 7.	A W Barrows, 303 California
Guanacaran and California M Co, B C.	6. \$3.00. Jan 9, Mar 15, Apr 5.	E Oliver, 22 Mint Ave
Imperial M Co, Nevada.	33. 3c. Jan 23, Feb 25, Mar 15.	C L McCoy, 331 Pine
Keystone Con M Co, California.	2. 55.00. Jan 31, Mar 7, Mar 23.	J H I ham, 310 Pine
Los Gatos Lime Co, California.	2. 50c. Jan 11, Feb 23, March 25.	W S Somerville, 323 Montgomery
Martin White M Co, Nevada.	27. 2c. Jan 8, Feb 11, March 12.	C E Elliott, 303 Montgomery
Mexican G & S M Co, Nevada.	44. 25c. Jan 14, Feb 17, March 10.	C E Elliott, 303 Montgomery
Middle Creek G Co, British Columbia.	2. 5c. Jan 16, Feb 20, Mar 22.	H D Hawks, 318 Pine
North Belle Isle M Co, Nevada.	13. 20c. March 1, April 5, May 3.	J W Pew, 310 Pine
Northwestern G & S M Co, British Columbia.	4. 20c. Jan 15, Feb 24, Mar 16.	F Bonancia, 438 California
Occidental Con M Co, Nevada.	9. 25c. Jan 8, Feb 16, March 10.	A K Durbrow, 309 Montgomery
Overman M Co, Nevada.	63. 51c. Feb 10, Mar 16, Apr 6.	G D Edwards, 414 California
Peer M Co, Arizona.	12. 10c. Feb 21, March 26, April 23.	A Waterman, 303 Montgomery
Pine Hill M Co.	1. 4c. Feb 11, March 24, April 15.	Ohas A Hare Stewart St
Sierra Nevada M Co, Nevada.	101. 30c. Feb 1, Mar 4, Mar 24.	E L Parker, 309 Montgomery
Union Con S M Co, Nevada.	45. 25c. Jan 6, Feb 11, March 2.	A W Barrows, 303 California
Weldon M Co, Arizona.	5. 5c. Feb 9, Mar 15, Apr 14.	A Waterman, 303 Montgomery
Yellow Jacket M Co, Nevada.	50c. Feb 2, Mar 4, Apr 2.	W H Blauvelt, Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	MEETING.	SECRETARY.	DATE.
Delhi M Co, California.	Annual.	O F Hunt, 320 Sansome.	March 9
Evening Star M Co.	Annual.	J J Scoville, 320 Sansome.	March 16
Hale & Norcross M Co, Nevada.	Annual.	A B Thompson, 303 Montgomery.	March 9
Indian Creek M Co, California.	Annual.	S O Mill, 318 California.	March 5
Potosi M Co, Nevada.	Annual.	C E Elliott, 303 Montgomery.	March 9
Pyramid M Co, Nevada.	Annual.	G W Harvey, 125 R F ave.	March 10

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Champion M Co.	10.	T Wetzel, 320 Sansome.	Aug 15
Cons Cal & Virginia M Co, Nevada.	50.	A W Havers, 309 Montgomery.	Aug 17
Copita M Co.	30.	E M Hall, 318 Montgomery.	Sept 10
Eureka Con M Co, Nevada.	25.	H P Busb, 101 Sansome.	Oct 1
Great Western Quicksilver M Co.	1.	A Halsey, 328 Montgomery.	Oct 5
Idaho M Co, Grass Valley.	3 00.	Grass Valley.	Aug 4
Mayflower Gravel M Co, California.	50.	D M Kent, 330 Pine.	Aug 20
Pacific Coast Borax Co, California.	1 00.	A H Clough, 233 Montgomery.	Feb 10
Standard Cons M Co, California.	10.	J W Pew, 310 Pine.	Jan 26

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FOR ALL UNDERGROUND PURPOSES, we immerse the Pipe
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REMOVAL!

The Office of Blue Lakes Water Co.,

By resolution of the Board of Directors,
Is Removed from 307 Sansome Street to
119 BUSH ST., SAN FRANCISCO,
DANIEL E. HAYES, Secretary.
San Francisco, February 24th, 1892.

DIVIDEND NOTICE.

OFFICE OF THE PACIFIC COAST BORAX COM-
pany, San Francisco, February 29, 1892. At a meet-
ing of the Board of Directors of the above-named Com-
pany, held this day, a Dividend (No. 15) of One Dollar
(\$1.00) per share was declared, payable THURSDAY,
March 10, 1892, at the office of the company, No. 230
Montgomery St., Rooms 11 and 12. Transfer books will
close March 5, 1892, at 3 o'clock, P. M.
ALTON H. CLOUGH, Secretary.

TUBBS CORDAGE CO.

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Constantly on hand a full assortment of Manila Rope
Duplex Rope, Tarred Manila Rope, Bay Rope, Whale Line,
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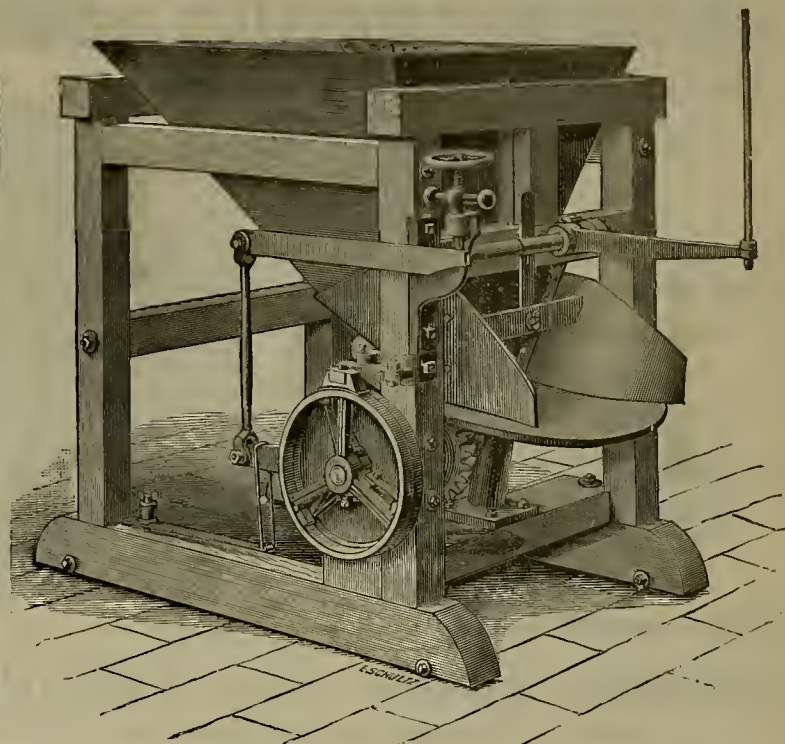
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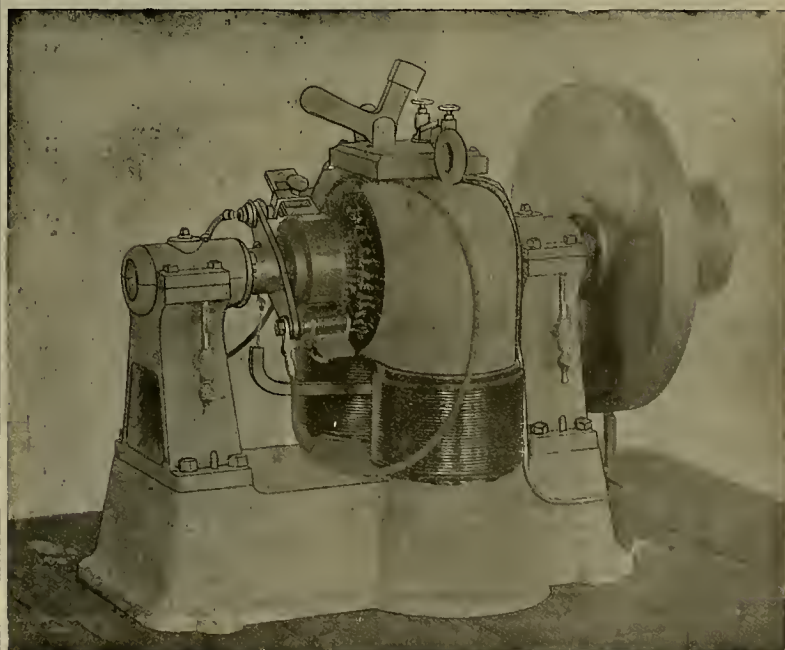
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Saves all the Gold. Uses very little Water. Treats large quantities at Low Cost.

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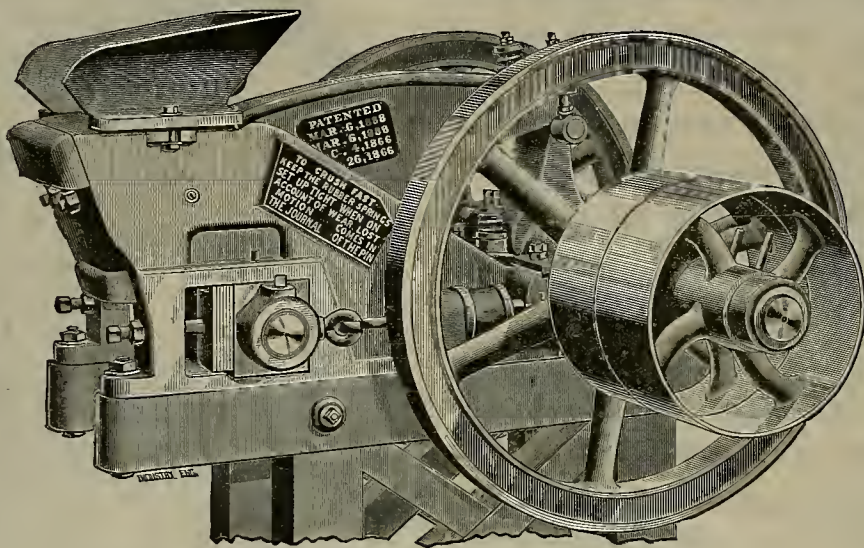
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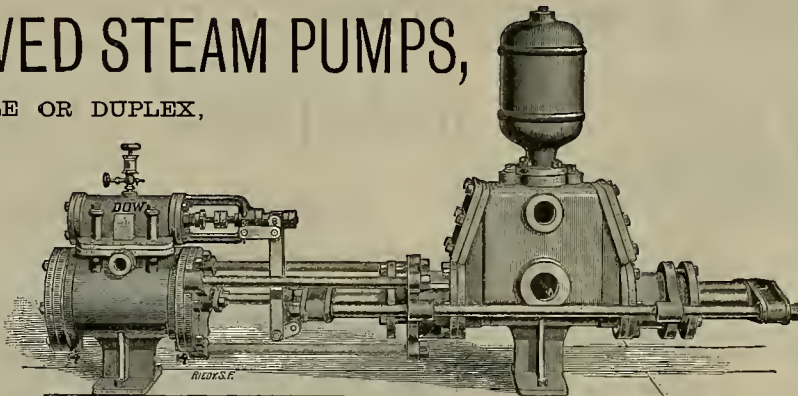
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ATLAS IRON WORKS,

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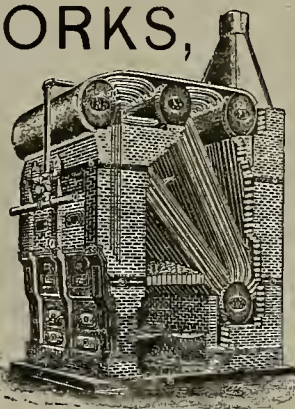
BUILDERS OF

Mill, Mining, Street Railway and
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PACIFIC COAST AGENTS FOR THE

Sterling Water Tube Safety Boiler,

Safest, Most Economical and Durable Boiler in
the Market. Specially Adapted to Mining
Purposes—Being Easily Transported over
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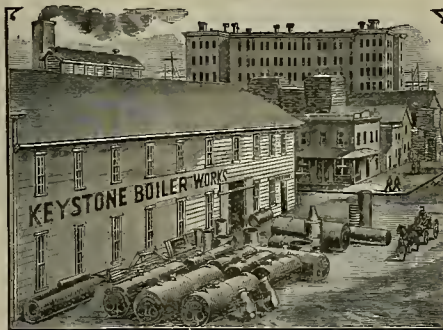
Pacific Chemical Works.

HENRY G. HANKS,

Practical and Industrial Chemist, Assayer
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Will report on the condition and value of any mining property on
the Pacific Coast. Rare Chemicals made to order. Instructions given in
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HAMILTON & LEACH,

Main and Folsom Sts.,
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THE GIANT POWDER COMPANY.

— PATENT OWNERS OF —

NOBEL'S DYNAMITE, NOBEL'S EXPLOSIVE GELATINE, NOBEL'S
GELATINE-DYNAMITE, AND THE JUDSON IMPROVED POWDER.

Best and Strongest Explosives in the World.

JUDSON POWDER.

The only Reliable and Efficient Powder for Stump and Bank Blasting. Railroad Contractors and Farmers
use no other. As others IMITATE our Giant Powder, so do they Judson, by manufacturing
an inferior article.

BLACK POWDER.

The Giant Powder Co. having built Black Powder Works, with all the latest improvements, at Olipier Cap, Placer
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CAPS and FUSE at Lowest Rates.

THE GIANT POWDER COMPANY, 30 California St., San Francisco.

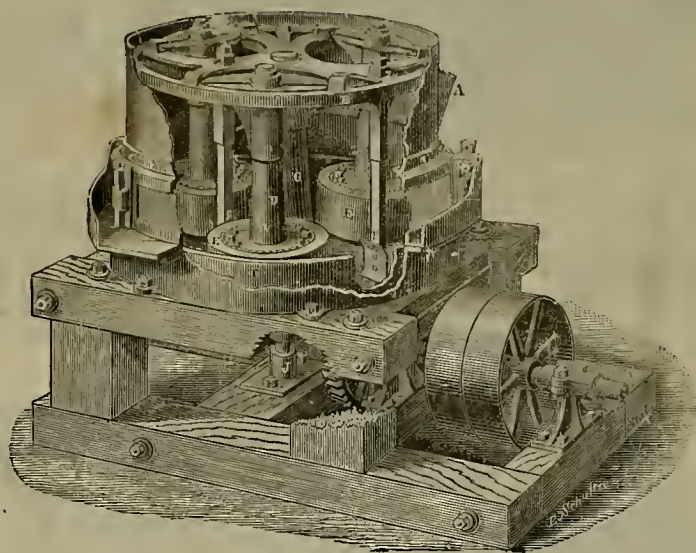
DEWEY & CO. { 220 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front.

F. A. HUNTINGTON.

PATENT ORE FEEDER. CENTRIFUGAL ROLLER QUARTZ MILL.



This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

F. A. HUNTINGTON,

MANUFACTURER AND DEALER IN

STEAM ENGINES AND MINING MACHINERY OF EVERY DESCRIPTION.

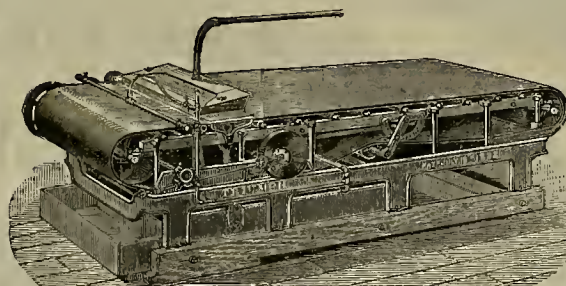
OFFICE AND WORKS, 213 TO 219 FIRST STREET, SAN FRANCISCO, CAL.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frue" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt . . . \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt . . . \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if used be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
Grass Valley, Nevada Co., Cal., Nov. 10, 1885.

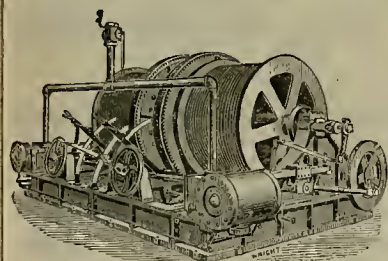
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrator is the equal, if not superior to any other style of Vanner or concentrating device.

DAVID McKAY, Jr.,
Supt. North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

HOISTING ENGINES FOR MINES



1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

MADE ONLY BY THE

LIDGERWOOD M'F'G CO.,

5 & 7 N. First St., Portland, Oregon.
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84 and 86 West Monroe St., Chicago.
197 to 203 Congress St., Boston.
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PARKE & LACY CO., Agts., San Francisco.
FRASER & CHALMERS, Agents,
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IT HAS NO EQUAL.

Can Be Put On
by Any One.



POSITIVELY FIRE-PROOF.

Adopted by the
Navy.

MAGNESIA SECTIONAL COVERING

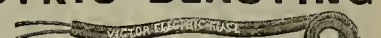
For BOILERS, STEAM PIPES, COLD STORAGE, and all places requiring Non-Heat-Conducting Material.

N. E. CORNER
PACIFIC & DAVIS STS.—C. B. JOHNSON & CO.—SAN FRANCISCO

ELECTRIC BLASTING.



Send for Catalogue.



VICTOR ELECTRIC PLATINUM FUSES.
Superior to all others for exploding any make of dynamite or blasting powder. Each fuse folded separately and packed in neat paper boxes of 50 each. All tested and warranted. Single and double strength, with any length of wires.

VICTOR BLASTING MACHINE. Made in two sizes. No. 2 fires 20 to 30 holes. No. 1 fires 5 to 8 holes. Adapted for prospecting, stump blasting, quarry and general railroad work.

"PULL UP" BLASTING MACHINE. The strongest and most powerful machine ever made for electric blasting. No. 4 size fires 70 holes. No. 3 size fires 40 holes. Are especially adapted for submarine blasting and large mining work.

Standard Electric Fuse and Blast Tester. Wire Reels, new design, Leading and Connecting Wire.

MANUFACTURED ONLY BY

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128 Maiden Lane, New York City.

PARKE & LACY CO., San Francisco, Cal., AGENTS.

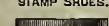
Adamantine Shoes and Dies

—AND—
CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.



STAMP SHOES.



STAMP DIES.

THESE CASTINGS ARE EXTENSIVELY USED IN ALL THE MINING STATES and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.

Manufactured by **CHROME STEEL WORKS, Brooklyn, N. Y.**

H. D. MORRIS, Agent, 220 Fremont St., San Francisco.

Special attention given to the purchase of Mine and Mill Supplies.

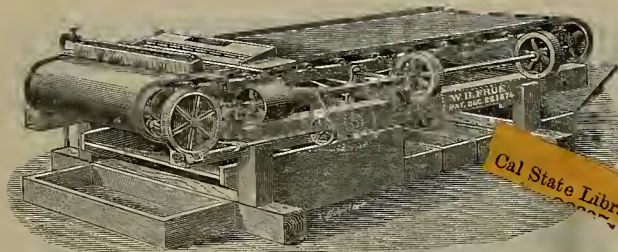


Stamp Cam

FRUE ORE CONCENTRATOR

OVER 3200 IN ACTUAL USE.

Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.



MESSRS. ADAMS & CARTER, 132 Market Street, San Francisco, Cal.—GENTLEMEN: After a continuous trial of different concentrators comprising the Frue Vanner, the "Holland," "Paradox," "Triumph" and the "Woodbury" (concentrators), extending over several months, we find that we prefer the Frue Vanner, as it is easier of adjustment, runs smoother, has less wear and tear, and—having a positive travel—gives less trouble than the other more complicated and ever changing machines now in use here. The Frue Vanner not only saves a cleaner concentrate, but has less loss in the tailings, and is in several ways preferable to the other concentrators here. I am, my Dear Sir, Yours faithfully,
S. HARRIS, Manager.

SAN JACINTO ESTATE, LIMITED,
Office of General Manager,
P. O. Address, South Riverside, San Bernardino Co., Cal.
CAJALCO, Dec. 18, 1891.

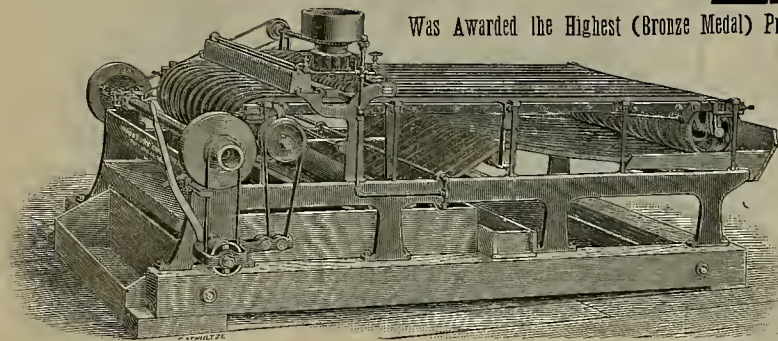
For further information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.

Price of 4-foot wide Plain Belt Frue Vanner..... \$550, f. o. b.
" " Improved Belt Frue Vanner..... 800, f. o. b.
" 6-foot " Plain Belt Frue Vanner..... 800, f. o. b.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO.,
No. 132 Market Street. — — — San Francisco, Cal.

WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

Was Awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891.

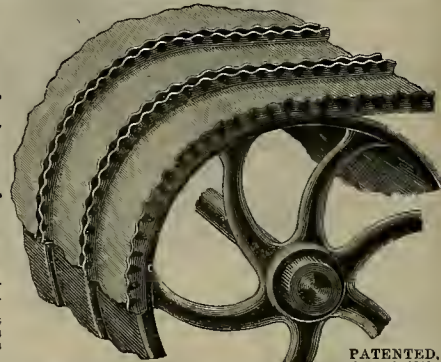


More than Double the Capacity
With One-Half Less Power and Occupying Less than
One-Half the Space of any other Concentrator.

Built of Best Steel and Wrought Iron.
STRONG AND DURABLE.

Price..... \$575 f. o. b.
Send for Catalogue and Testimonials.

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. This excess in length of material effectually prevents the edges from cracking; plain edge belts have to stretch about one inch to the foot as they pass around the drums. This continuous stretch cracks the edges. The improved belt obviates that difficulty.



PATENTED,
Aug. 19, 1890.

G. O. E. WOODBURY, Man'fr, 213 to 219 First St., San Francisco.

THE PELTON WATER WHEEL

GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD. OVER 2000 IN ACTUAL USE.

Affords the most simple and reliable power for all mining and manufacturing machinery. Adapted to heads running from 20 up to 2000 or more feet. From 20 to 30 per cent better results guaranteed than can be produced from any other wheel in the country.

ELECTRIC TRANSMISSION.

The advantages the Pelton Wheel affords in the way of a uniform and reliable power, close regulation, and the facility of adaptation to varying conditions of speed and pressure, have brought it into special prominence and extensive use for this class of work.

All applications should state amount and head of water, power required and for what purpose, with approximate length of pipe line. SEND FOR CATALOGUE.

THE PELTON WATER WHEEL CO.

121-123 MAIN STREET, SAN FRANCISCO, CAL., U. S. A.

143 LIBERTY STREET, NEW YORK, U. S. A.

PELTON WATER MOTORS, Varying from the fraction of 1 up to 40 and 50-horse power, unequalled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. Address as above.

THE GATES ORE AND ROCK BREAKER.

UNLIMITED IN CAPACITY. UNEQUALLED IN EFFICIENCY. UPWARD OF 8,000 NOW IN USE. Will do more than twice the work of any other with the same cost in wear. Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

It having come to the notice of the undersigned that their patent rights are being infringed upon, intending purchasers are hereby warned that all such infringements will be duly prosecuted. (Signed) THE PELTON WATER WHEEL CO.

THE PELTON WATER WHEEL CO. 121-123 Main Street San Francisco, General Western Agents.



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SILVER-PLATED AMALGAMATED PLATES
For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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JUSTINIAN CAIRE, Agent.

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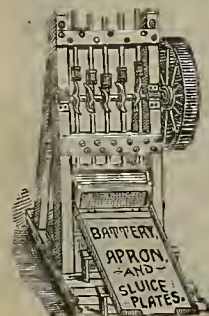
Assayers' and Mining Material.

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BATTERY SCREENS AND WIRE CLOTH.

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HYDRO-CARBON ASSAY FURNACES.



IMPORTANT TO GOLD MINERS!
SILVER-PLATED AMALGAM PLATES for SAVING GOLD
In Quartz, Gravel and Placer Mining.

PRICES GREATLY REDUCED. ONLY REFINED SILVER AND BEST COPPER USED. OVER 3000 ORDERS FILLED. FIFTEEN MEDALS AWARDED. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated. These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Streets, San Francisco.

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E. G. DENNISTON, Proprietor.

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Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper.
SEND FOR CIRCULAR.



RECEIVED EVERY MEDAL
Awarded on the Pacific Coast
for Silver-Plated Amalgam
Plates and Best Gold, Silver
and Nickel Plating.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV. — Number 11.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MARCH 12, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Improved Rock-Breakers.

The Booth continuous-crushing combination rock-breaker is a machine devised to meet the demand of millmen for one of large capacity, giving a finer and more uniform product and increased capacity over the ordinary rock-breakers. The Booth machine consists essentially of two moving jaws, one pivoted above its crushing face and operated by the well-known Blake principle, the other moving jaw being placed immediately beneath it, pivoted below its crushing face and operated on the Dodge principle. Each crushing movement is thus called upon to do the work for which it is best suited, one for coarse and one for fine crushing.

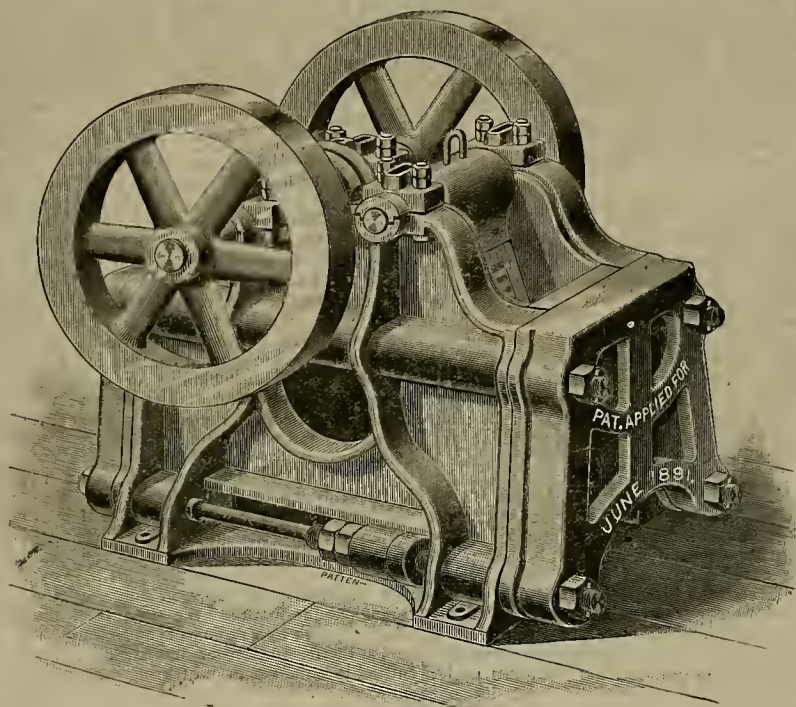
The crushed rock falls from one jaw to the other, the lower edge of the upper jaw being in all positions in advance of the upper edge of the lower jaw. Both movements are reciprocal and driven from the same eccentric shaft by entirely independent connections, so designed that it is possible to disconnect one movement and still run the other. It will be readily seen that as the eccentric shaft revolves, first one and then the other jaw approaches the stationary die, each receding as the other makes a forward crushing movement, giving a practically continuous crushing effect. Among other advantages derived from this division of the work are the greatly reduced strains upon all parts. It will also be noticed that all the tensile strains through-

wrench being provided for them. Adjustment of the upper part of the lower jaw is also possible by means of the nuts on the ends of the connecting rod. As the size of

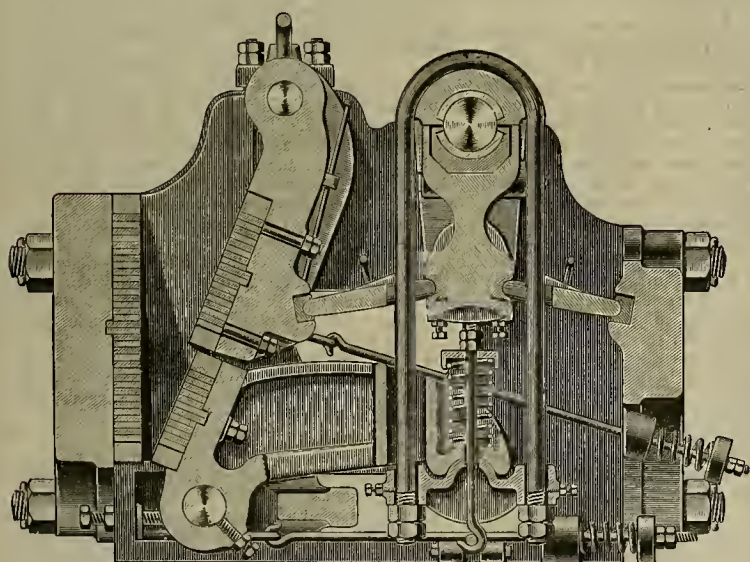
wear slightly below the steel, giving a continually corrugated surface, having a superior crushing effect, preventing all slippage of the material and largely increasing

in the engraving. The Blake machine itself is well known everywhere. Attention is called to the wedge adjustment in the center of the pitman, by means of which the size of product is quickly and easily adjusted. As this adjusting wedge tapers on each side, instead of on one side only, as is the case with the back wedge of the old style Blake machine, only about one-half as much movement of the adjusting nut is required to effect the same change in size of product. This style of adjustment also materially shortens the rock-breaker as compared with the old style machine, giving it a stronger and more compact frame.

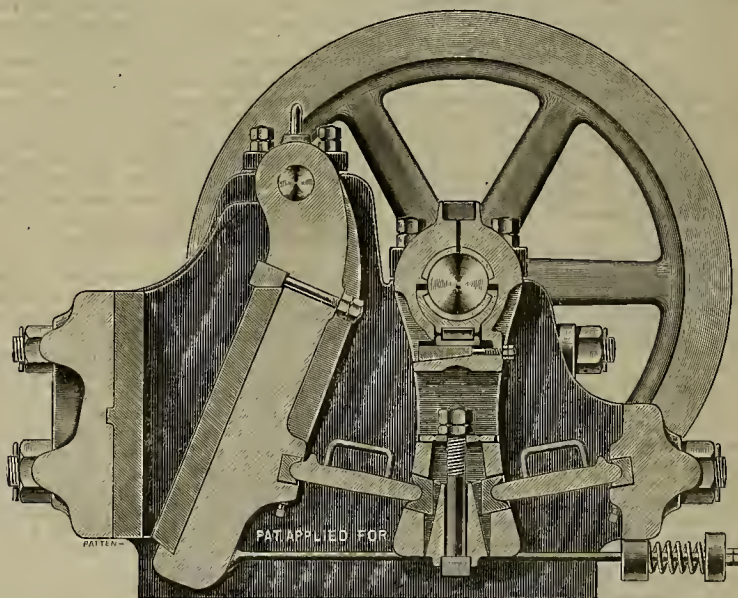
The bolts which take the crushing strain pass through hollow columns cast on side frames and running the whole length of the machine, thus making the side frames very strong and rigid. A loose, babbitted gib is fitted in the pitman-head and held firmly against the eccentric shaft by means of a spring set up by an adjusting wedge. This prevents all pounding and heating in the eccentric journal and insures quiet and cool running in this important bearing. Two pull-back springs are provided instead of one, thus giving a better effect and reducing liability to breakage. A safety device is provided in a cast iron plate placed under the head of the nut supporting the wedge in the center of the pitman. This plate is made strong enough to stand all ordinary crushing strains, but will break and allow the toggles to fall back, should a pick-point, sledge or other foreign matter



BOOTH'S COMBINATION ROCK-BREAKER.



SECTION OF COMBINATION ROCK-BREAKER.



THE BOOTH IMPROVED BLAKE ROCK-BREAKER.

out the machine are taken by wrought iron or steel rods, while the compression strains fall upon cast iron, the design of the machine being about perfect in this respect. By an arrangement of springs all lost motion of bearings is at once taken up.

The adjustment of the size of output in the lower jaw is made by means of the nuts on the lower extension rods, which take the crushing strain from the pivot boxes, a

the product does not depend upon the upper jaw, adjustment here is seldom required, one in the life of a shoe and die being all that is wanted—just sufficient to keep its lower edge in advance of the lower jaw. An extra toggle is provided for effecting this. The shoes and die consist of alternate layers of wrought iron and hardened steel bars set upon edge and secured within forged steel bands. The wrought iron bars

the capacity of the rock breaker. The advantages claimed for this machine are large capacity; continuous crushing; large receiving capacity in proportion to fineness of output; improved crushing faces; reduced wear and tear and liability to breakage, due to dividing the work; and great strength.

Other improvements in rock-breakers, also designed by Mr. Booth, are those applied to the Blake rock-breaker, and shown

fall in the jaws, preventing injury to the machine. The shoe, die and toggle seals are made of cast steel and the eccentric shaft of forged steel. The design, metal and proportions throughout have been determined from actual practice, and with the other improvements make this an unusually strong and efficient machine. Both these rock-breakers are manufactured in this city by the Risdon Iron and Locomotive Works.

A Manual of the Steam Engine.

"The Manual of the Steam Engine," for engineers and technical schools (advanced courses), by Robert H. Thurston, published by John Wiley & Sons, is one of the most important scientific works which has recently been issued. The first part of the manual, already published, constitutes in some sense an independent work, and may be considered an epitome of the purely scientific side of the subject, an expose of the theory of the steam engine, considered as a thermodynamic machine, and its efficiencies as such. Its purpose is twofold; first, the development of the mathematical processes which enable the engineer to trace the flow of energy into and through the engine, and to exhibit the direction of its variously distributed streams and their useful or wasteful disposition; second, the application of the facts, principles, equations and formulas of thermodynamics and of mathematical physics, thus collected into a system and a theory, to the computation of the quantities of heat, steam and fuel to be required for the production of power in a specified engine; and, further, the determination of just what proportions of engine and what distribution of steam will probably give the highest commercial result.

This treatise, perhaps too extensive for any except the higher order of technical schools, will serve well for the purpose of instruction in the senior classes of undergraduate courses in engineering. For the specialist and practitioner, however, this first volume is but the first step in a much larger course of study and construction. For his purposes, the introductory must be followed by a somewhat extended study of principles and current practice in the design, the construction and operation of the machine. It is this division of the subject which is treated in the second part of the work, which has been placed on our desk by Osborn & Alexander of this city, who have the book for sale.

The second part of this "Manual of the Steam Engine" is intended to present, as concisely as possible, the later and more usually practiced methods of design, construction and operation of the engine, as based upon the technical knowledge and experience of contemporary specialists and as illustrated in the best current practice. The first part of the work is for the study; this second part for the office.

The author states that he has been led to attempt the preparation of this second portion of the work in the endeavor to provide suitable instruction for graduate students in mechanical engineering. The volume offered to the advanced student and practitioner will be found to contain a condensed description of the operations involved in the design, construction and management—including preservation and repairs—of the steam engine. The introductory chapter on design includes the general discussion of the proportions of the compound and other multiple-cylinder engines, as well as that of details. The great development of this class of machines is well shown. The study of the valves and their gears is made mainly by the processes of Zeuner and other graphical methods. The chapters on construction and erection, and on the operation and care, are concise; but they are based upon long practical experience, observation and application.

The account of material used is abridged from a larger work by Prof. Thurston. The chapter on specifications and contracts is intended to be an exceedingly condensed discussion of that important subject. The last chapter is the first attempt to introduce the financial element into the theory and practice of steam-engine construction.

The book is splendidly printed and the illustrations carefully and accurately made. There are but eight chapters, as follows: Design of the steam engine; valves and valve motions; regulation, governors, fly-wheels and inertia-effects; construction and erection; operation, care and management; engine and boiler trials; specification and contracts; finance and costs and estimates.

Prof. Thurston is a recognized authority on this subject all over the world and no one is better fitted for writing a manual of the steam engine than he is. He has written several important technical books before, but nothing equal to this one. It is a standard work of study and reference, and will be in the library of every mechanical engineer in the country.

The Omaha Mine Accident.

The worst mining accident that has occurred at Grass Valley for some years took place last Saturday morning, Feb. 27th, in the Omaha and Lone Jack Cons. mine. An explosion of giant powder instantly killed young Phillip Cadden, badly injured Thos. Penberthy, nearly destroyed the sight of Charles Nile, and inflicted lesser injuries upon Wm. Meiers, Matthew Laity, Wm. Coombs and Edward Palmouter. The day shift men were just going below. The first truck, conveying the seven men above named, had gone down to the No. 10 level in the Lone Jack ground, and were about to commence work. They had put their dinner buckets in a customary place, and several were stooping down burning the ends of their candles so they would light readily when they would be needed for use. A few feet away there was a recess in the side of the drift, which was about breast high to a man, which had been made as a receptacle for the cartridges that were used in blasting. The recess had a cover to prevent any sparks falling from candles upon the cartridges when the men went to obtain them. The men before going to work were in the habit of taking cartridges from this and like receptacles in the mine before going into the stopes or to the end of the drifts, where they were to be used. While the seven men were in the drift, near where the cartridges were kept, there was a sudden explosion, and in a short time it was ascertained that Cadden was killed and all the others hurt.

The coroner's inquest failed to make any discovery as to the cause of the explosion. The Grass Valley Union says it is now thought that young Cadden might have stuck his candle against the side of the drift above the place where the box of giant powder caps were kept, and that a spark from it fell into the box and communicated to the fulminate in the caps. As the chief force of the explosion struck him, he must have been nearest to it. How many caps were in the box is not known, but when full, each box contains 100. It is evident that not many cartridges exploded, otherwise the drift would have been torn up considerably; but it was slightly affected by the explosion, and the car track was not disturbed at all.

LOSSES BY FIRE OF COAL-LADEN SHIPS. A correspondent inquires why it is that the cargo of coal-laden ships so often takes fire, with the general destruction of hot ship and cargo, and sometimes to the great danger and even loss of life. The question is also asked if gas generated from the coal is liable to take fire from pressure or otherwise, and whether any device has ever been patented to remove the gas from the hold. In reply: Safety devices in the form of specially constructed ventilators have been employed to allow the gases generated to freely escape from the hold. In regard to the origin of fires: They are not generally, if ever, caused by the presence of gas, but from heat generated from the decomposition of iron pyrites in the coal. Certain coals, if allowed to come in contact with water, will very soon take fire from that cause. Much of the coal from Mount Diablo and other places will soon take fire if left exposed to rain in an open atmosphere. Fires on coal ships are almost always due to water in some way coming in contact with their cargoes. The only way to prevent fires on coal ships is to keep all water away from the cargo.

A NEW USE FOR OIL AT SEA.—The use of oil as a means of reducing the friction on the sides of a ship, caused by the passage of the ship through the water, and thereby increasing her speed, has been suggested. The idea embraces many features that would seem feasible, but whether or not it would practically make any difference remains to be seen. The oil is fed in minute streams against the sides of the vessel by means of a series of perforated pipes, adjusted to the bow and extending from the keel to the water line, or higher. The progression of the craft passes the oil back toward the stern, and at the same time the inward pressure of the water prevents the oil leaving the sides of the vessel without doing its duty. Perhaps the oil might be more thoroughly distributed were the ship built with grooves along the sides. Another suggestion is to submit the oil to a chemical treatment, whereby it would prevent weeds and barnacles adhering to the vessel's bottom, and thus increasing the scope of the oil's duties.

EXPERIMENT WITH STAY BOLTS.—The number of headings which an ordinary 7-8 inch stay bolt will stand when riveted into plates of unusual thickness, one end being fixed and the other end moving one-eighth of an inch, has been proved by experiment to be from 2000 to 5000.

Early Hydranlicking.

A Test of Small Nozzles in 1856.

J. E. Emerson in Scientific American.

In 1856 I was chosen as one of a committee of three to witness a test of hydraulic mining, for the purpose of deciding a dispute which had arisen between different manufacturers of hose nozzles. One of the parties had more than a half-dozen made, in order to satisfy himself which was the best. The nozzlemen generally stood from 20 to 30 feet from the gravel bank. On this occasion the water came down through wrought iron pipe about eight inches in diameter, which ran down a steep hillside; to this was attached a canvas hose of eight thickness, and this was wound solid with about a 3/4 inch manilla rope, the lower end being tapered for say 50 feet to about four inches at the lower end; to this the strong rubber-lined woven hose of eight or ten thickness, and to the end of this, the brass hose. The hoseman on this occasion was a short-set, very strongly-built man, with a strap of leather over his shoulders and attached to the hose. The perpendicular fall of the water on this occasion was 186 feet, this being the most powerful pressure ever used for the purpose to that date. The gravel was what we called cement-gravel, so hard that it could scarcely be picked up. The extreme end of each nozzle was from 1 1/4 to 1 1/2 inches in diameter, varying in order to determine which would do the best work, or rather the most of it. In addition to the gravel, the ground contained large boulders of various sizes. One of the contesting parties claimed that the best results would be obtained by having the brass hose tapering from the canvas to within about six inches of the end, and that six inches to be of exact size; but the other party contended that the best results would be produced by having the nozzle tapered from the butt to the point as a true radial from 20 to 30 feet from butt to point; and that, if the radius was shorter than this, that the water would scatter after it reached the radial point. The man bolder or operating the nozzle would quiver and tremble as the water poured from the nozzle, and he compelled to stand with his feet braced apart to keep from being thrown down. On the bank stood a knarly white oak, about 18 inches through. Some gravel had been washed from under the roots of it. I suggested to the nozzleman to try each nozzle at 25 feet distant on the bark of the oak. This he did. The first nozzle with the six-inch parallel point took off some of the coarse outside bark. We then took the nozzle tapered to a radius of 25 feet, and it peeled the tree wherever it struck it, even cutting into the wood and tearing out small splinters. This nozzle we decided to be the best for hard gravel washings. The victor published our decision all over the State, and sent out circulars. He offered us each \$100 in gold, which we, of course, declined, we only allowing him to pay our expenses and \$10.

I lost \$5 of that \$10 on a bet with a gentleman who knew more than I did. I bet him \$5 that I could split the stream at the end of the nozzle with my penknife blade. So I went into the blacksmith shop and on an oilstone, whet my knife as sharp as it could be. I scratched the end of the nozzle across the center so as to have a channel for my knife to run in, but after working for over half an hour and getting as wet as a drowned rat, and rather a laughing stock, I gave it up and handed him his \$5 gold piece. It was singular to put one's hand against the stream at the very end of the nozzle, for it seemed as smooth as oil, and the end of one's finger merely made an apparent dent in it.

Many miners were badly hurt, and some of them killed, by being knocked down, by stumbling over rock, and getting caught in front of the stream and driven against the banks or into the gravel. On this trial I saw immense boulders turned over by the water from the nozzle of the hose, that I do not think five men could roll over by hand.

COAL FROM UNGA ISLAND.—A company has recently been formed by local capitalists to work the extensive coal fields at Coal Harbor, Unga Island, Alaska. John C. Green, the manager of this new company, made a personal examination of these coal fields during the summer, and he reports the deposit on Unga Island to be practically inexhaustible. To use his language: "There is coal enough there to supply the United States." The new whale-hack steamer will be brought into use, and it is claimed the coal can be laid down here at a cost of \$3.50 per ton. Interested in the enterprise are Irwin C. Stump, Frank McLaughlin, R. C. Chambers, the superintendent of the big Ontario silver mine, Utah;

A. S. Baldwin and C. W. McAfee. A vessel may be sent up within 30 days. Statistics show that San Francisco is yearly paying out from \$12,000,000 to \$15,000,000 for imported foreign coals, and has actually paid out during the past six years not less than \$75,000,000 for its fuel supply.

British Coal Miners.

Cablegrams from London dated March 3rd are to the following effect: The Leicestershire coal mine owners to-day gave notice of a further advance in the price of coal. The latter advance makes a total rise of seven shillings per ton within one month. This increase falls heavily on the poor. The rise is attributed to the already determined intention of 460,000 miners to cease work in less than a fortnight in their efforts to prevent a reduction in wages.

The action of the miners in announcing that they would go on a strike on the 12th inst. and the rapid rise in the price of coal following that announcement, are leading to a panic. The cold weather, which led to the consumption of a larger quantity of coal than usual, continues to prevail, and this fact caused the alarm to become greater than would otherwise have been the case. No one knows where the advancing price will stop, and consequently everybody is anxious to lay in enough coal now to tide over a two weeks' strike. The merchants declare if the present demand is continued the stocks will last for only ten days. The newspapers all publish articles in reference to the situation and urge the public not to become panic-stricken, as prices cannot make much further advance, owing to foreign competition.

Nevertheless the retail dealers are flooded with orders and all the coal wharves and depots are besieged. Coal is selling in London to day at \$10 per ton.

One week from to-day 460,000 miners will stop work. Another half-million workmen in the iron mills and factories will be thrown out of work.

The well-known Belgian socialist and labor leader, M. Volders, announces from Brussels to-day that the Belgian working-men's party and Miners' Federation will order the Belgian miners to restrict the output so that no coal can be shipped to England. In their strikes, the Belgian miners have received substantial aid from the miners of Great Britain, and, now that the opportunity offers, their leaders think they ought to aid by every means, their British brethren.

The British miners are striking to prevent a threatened reduction of wages. By restricting the production they hope to force the consumers to pay more for coal so that the mine owners will not cut the miners' wages. The last two or three years have witnessed a very material revival of the coal industry. It appears to be generally admitted that the miners have since 1888 received advanced wages that have in most districts reached about 50 per cent over the wages paid in that year.

It is estimated that the average wages paid in and about the mines to all classes of employes is about \$5 per week all the year round. There are employed in the coal mines 602,517 persons. The experience of the coal trade shows that when the range of wages is pretty good, men are drafted in to it from every sort of outside industry and occupation, not even excluding sailors, shoemakers, butchers and bakers.

It was announced this afternoon that the coal owners of Durban have definitely determined to lock out 80,000 miners within a short time if they refuse to accept a reduction in wages. About 35,000 miners in Scotland, the midlands and in the north will have a holiday of two weeks from March 11th, with a view to reducing the stocks of coal on hand.

IT MADE NO MISTAKES.—Some of the journals of the State of Nevada are dissatisfied because the late State Convention of the miners of California had no speeches or resolutions in favor of the free coinage of silver. The convention was called for the single purpose of taking action that would result in the restoration of hydraulic mining, and not to discuss coinage, tariff, or any other question of political economy. The convention would have failed in the harmonious action that characterized its proceedings if it had gone outside of the business for which it was called. It was a thoroughly level-headed convention, and did its work well, and to the satisfaction of every interest in the State, and in that respect was the most remarkable assemblage that ever met together in the State, considering the long and bitter struggle that had existed between the miners and farmers.—Grass Valley Union.

The Bennett Amalgamator.

A Machine for Saving Flour Gold.

E. S. Bennett, inventor of the noted Bennett amalgamator, is about to have his 15 long years of struggle, study and litigation over his great placer machine rewarded.

An organization of immense significance has just been consummated, says the *Denver Times*, with a capital of \$10,000,000, for the exclusive right to utilize his invention within the State of Colorado, and \$23,000 has been paid to him already on account of this right. Parties from California are also negotiating with him for the exclusive right to that State, agreeing to pay for the same \$500,000. The direct cause of this sudden interest in Bennett's remarkable patent may be traced to the recent results of its few months' work at Arvada while being operated in a perfected form.

The company was originally formed for the purposes of experimenting and perfecting the machine in Summit county with \$1,000,000 capital, and not a share has ever been sold for less than \$100, the par value.

A meeting of the Board of Directors was held immediately after the recent election and the reorganization of the company effected. The recapitalization was placed at \$10,000,000, taking place within the next 60 days. It was also decided to erect a \$250,000 plant in Denver for the purpose of manufacturing the machine. The condition of the financial interests of the company is in a highly satisfactory state, the assets being \$235,383.65 and liabilities nothing.

The problem before the mining world ever since the discovery of gold, as every mining man well knows, has been the ability to handle sufficient dirt to make placer mining a success, together with the certainty of saving the microscopic atoms which are held in suspension in water. This is the gold that has always heretofore been irretrievably lost in the operation of the sluice box and milling system.

The company purchased a strip of barren land at Ralston and Clear creeks. It had been worked years ago and was considered fair placer ground, but it was supposed that it had been entirely worked out. The closest panning only showed two cents per cubic yard. In about one month's steady work, and in spite of the fact that the Bennett machine only handled old tailings, from 15 to 20 cents per cubic yard were saved, and a greater yield is expected as they get into virgin territory. The singular part of this work lies in the fact that a triple quantity of infinitesimal or microscopic gold was saved as compared to the coarser or, what is commonly termed by mining men, flour gold. This seems to demonstrate the fact that the machine saved all of the precious metal left by the original workers.

An idea of the infinitude of the fine gold saved may be gained from the statement that in a phial of water it may be shaken until the solution is black. A name may be written on paper and afterward burnished until the atoms being rubbed into the porous substance glitter brilliantly. Although gold is universally admitted to be 19 times heavier than water, yet these microscopic particles are so light that after the denser atoms have sunk in a phial after shaking, there is sufficient time left to pour off the floating atoms.

Fully 75 per cent of the product of the machine has been the finest gold. The machine scoops up the placer earth, carries it to a hopper, from whence it enters a drum, the boulders passing around a screw and being thrown out on the opposite side, while the fine dirt passes through a fine mesh on the plates. These are of copper, plated with silver and coated with amalgam. Each atom is forced into unavoidable contact with mercury 400 times, each time under the most favorable conditions for instant amalgamation. This is the principle of the machine in brief—a patent that promises to revolutionize placer mining. The power is wholly electric, and only three men are needed to operate.

ALLOYS OF SILVER.—That alloys of silver can be electro-deposited on a commercial scale is not a new discovery, for the alloy of silver coin has been deposited ever since the discovery of the art. The advantages gained by using the alloy, rather than the pure metal—are greater hardness, combined with cheapness of material and reduced liability to oxidation. On the other hand, the difficulty of burnishing the metal is increased, and the distinguishing white color of pure silver must be sacrificed to some extent. The color can, however, be improved by leaving the plated work in the bath for some little time after the current is switched off. This fact is due, no doubt, to copper being electro-positive, relatively to silver, in solutions of cyanide of potassium.

Plymouth Con. Gold Mining Company.

The ninth annual report of this corporation makes the following exhibit:

Gold product from mines.....	\$19,774 80
Miscellaneous receipts.....	2,350 16
New receipts.....	\$22,124 96
Surplus carried over from 1890.....	22,258 93
Year's income.....	\$44,383 89
Operating expenses and taxes.....	40,658 07
Surplus Jan. 1, 1892.....	\$ 3,725 82

We append what the directors report touching the year's explorations and present underground situation of the property:

"When our last annual report was submitted to the stockholders, work was being prosecuted on the east parallel vein, running both north and south. Considerable ore was found in both drifts. The tunnel south was run about 185 feet, when the vein matter gave out and work was suspended. The north tunnel was driven about 70 feet. The tunnel yielded good ore, but the vein was narrow. An upraise was decided on in the north tunnel and commenced the first week in February. The ore varied from one to two feet in width and was rich and poor alternately. In some places there were small quantities of exceedingly high grade.

"This upraise was carried to a height of nearly 200 feet, the vein widening at the top to nearly six feet, with a good grade of ore. With so favorable an outlook, the management felt justified in commencing a new tunnel in order to work this rock advantageously. This new tunnel was commenced early in July, and has now reached a length of 700 feet. We are expecting daily to strike the lode line. From the point of contact it is about 200 feet to the upraise. It is possible that some portion of this 200 feet will be in ore. We anticipate finding a considerable body of good rock in the vicinity of the upraise, possibly enough to run our mill for some time.

"The mill was started on the 8th of April, running ten stamps, producing fair results. With several interruptions, the mill was run through the summer, and also for a part of the month of October. Lack of ore compelled the superintendent to shut down the mill entirely for the present."

The present company was formed June 1, 1883, by the consolidation of the Empire, the Amador Pacific and the Plymouth companies. The mines were well developed, and a considerable amount in dividends had been paid. Prior to the consolidation, gold bullion to the amount of about \$2,500,000 had been produced.

The following is a statement of all the receipts and expenditures of this company from organization, June 1, 1883, to Jan. 1, 1892, a period of eight years and seven months:

June 1, 1883—Cash on hand at time of organization of company.....	\$ 153,319 80
Gold bullion produced by mine as follows:	
To Jan. 1, 1891.....	\$4,045,982 88
For year 1891.....	19 774 81
Total bullion produced.....	\$4,065,757 69
Miscellaneous.....	5,667 63
	\$4,071,425 32
Total receipts.....	\$4,224,715 11
DISBURSEMENTS.	
Operating expenses.....	\$1,723,337 12
Construction since June 1, 1883.....	217 682 17
Fifty-seven dividends, averaging \$40,000 each.....	\$2,280,000 00
	\$4,221,019 29
Cash on hand Jan. 1, 1892.....	\$3,995 82

A Safety Car Brake.

Next to a proper coupling device nothing is more needful to a train than an easy, prompt and sure-acting car brake. Many hundreds of lives are lost annually from imperfection in these two devices. The necessity of the former is considered so important that attention was called to it by President Harrison in his last annual message. The importance of the latter is scarcely, if any less. One of the latest inventions in connection with the brake is one wherein the combined principles of the screw and spring pressure are applied.

It is an established fact that the screw is one of the greatest mechanical powers. A car brake has been lately invented which bids fair to revolutionize the system of car-braking. It consists of a right and left screw, with traveling nuts thereon, hung in the center of a car, connected with yokes passing around elliptic springs, which are attached to the shoe beams, thereby producing an elastic pressure of the wheels; the screw to be operated by sprocket wheels and chain belts, or with gears, from the platform at either end of the car. This principle can be applied in different ways, to suit different kinds of railway vehicles. This combina-

tion of screw and spring pressure appears to be the true principle of car-braking, and has only to be tried to be appreciated by the public. No jarring a person off the seat need happen by this kind of pressure being applied to the wheels, as the screw graduates the power very nicely, and is effective in every particular. Many lives might, in all probability, be saved and innumerable accidents averted in the United States alone, by using such apparently reliable action. A steam train can be stopped quite as quick and with less jolt than with any other method owing to the elastic grip it gets upon the wheels, which cannot be got in any other way with safety. The invention seems to be one of much promise and will, no doubt, be thoroughly tested.

The Pegleg Mines.

The San Diego *Union* says: There arrived on the steamer Santa Rosa a party of four intrepid explorers, Thomas L. Doran, John K. Bell and George Curtis of San Francisco, and H. L. Forest of New York, who are starting on a search for the famous Pegleg mines. Years ago, the old trapper, Pegleg Smith, was found insane from thirst by a party of emigrants wandering about on the desert this side of Yuma, having in his possession several large nuggets of solid gold. The party carried him with them until he recovered, but he could give only a general idea of the location of his find, and that it consisted of three little hills of gold, one of which appeared quite black at a distance.

The party will fit out in this city and will leave on an expedition which may make them millionaires, or, on the other hand, cause them to leave their skeletons bleaching on the hot sands of the desert, as so many have already done in the same search. They will take two teams, four mules and eight or ten burros. The mules will haul the wagons from camp to camp, while the burros will be used to carry water and provisions on trips of a week or so from the headquarter camp. Leaving San Diego, the party will follow the old Yuma road to the desert, and will then strike out northward to Carrisa creek, where the headquarter camp will be located and provisions for six months stored. From Carrisa creek Doran and Bell will explore the country in a radius to about 40 miles to the northwest and northeast, in which section they are confident the Pegleg mine lies. It is their intention to make a clean scouring of this portion of the desert, and to settle for all time the existence or nonexistence of the famed lost mine. In his former exploration, Doran demonstrated that it was not to the south of Carrisa creek.

SANTA PAULA is a thriving town of about 1500 people, lying near the center of Ventura county and upon the S. P. R. R. It is 66 miles from Los Angeles and 15 from Ventura. Santa Paula is the center of the oil industry of this State. The Union Oil Co. handles the product of about 60 oil wells, the yearly output of which is stated by the Santa Paula *Chronicle* to be 500 barrels per day. From this product is manufactured naphtha, benzine, illuminating oil, lubricating oils and printers' ink. The manufacture of aniline dyes and many other articles will begin as soon as proper buildings can be completed. About 750 men find employment in the oil business, and the property of the Union Oil Co. alone is thought to be worth \$2,000,000.

AMERICANITE—A NEW EXPLOSIVE.—Americanite is the name of a new explosive of great power. The principal ingredient is nitro-glycerine; the other component parts are secret. It is said to be insensible to shock, and explosive at will. It withstands friction, and if ignited with a match, simply burns like a candle. An American expert reporting upon it states that the advantage of being able to use with safety an explosive of a force equal to nitro-glycerine fired from any gun in existence and with terrific effect at a long range, is evident. With so powerful an agent, the problem of coast defence is able almost to resolve itself into one of range, and our great cities may be made comparatively safe with very little expenditure.

TO REDDEN STEEL.—A method for reddening watch hands or other small pieces of steel work, is given on the authority of a practical horologist. Make a paste from two parts chloride of silver, two parts carmine, and one part of Japan varnish, heated together. Spread some of this over the surface of the steel work, and lay it face upward on a thin sheet of copper, applying heat then until the tint desired is obtained.

Cable Alarm Boxes.

In order to avoid such accidents as have occurred of late on the California street cable railroad, the managers of the line have made arrangements for the introduction of a system of alarm boxes to be placed along the road.

"Our telltales in the power house," said Superintendent J. W. Harris to a *Call* reporter, "indicate at once when there is anything wrong with the cable as it passes through the house, but they do not tell when there is a loose strand out on the line.

A strand down at Kearny street may get loose and roll up for 100 feet or so and nothing be known of it in the power house until it is reported by the conductors. Now, the object of the new alarm system is to give our engineer immediate warning of any break, loose strand or other defect in the rope.

"We will have five alarm boxes from the eastern terminus of the line to Hyde street, and four from there to Central Avenue. When a strand is cut and comes loose, the gripman will at once tell the conductor, and he will run to the nearest alarm box. He will take a crank key provided him and constantly carried, and will unlock the box, when he will signal to the engineer, who will at once stop the engine, and the repairers will go out and fix the rope so that it may safely run again.

"We think these alarm boxes will be a very valuable addition to our cable system. They will certainly save much vexatious delay in the repair of cables, and will give us a much better service all around, to say nothing of the safeguard against accident." Mr. Harris explained that the chief cause of the trouble on Tuesday morning last, when a car made a toboggan run down California street hill, was that the track was slippery. The track and wheel brakes acted all right, but the wheels were lifted from the track by the application of the wooden brakes resting on the rails. The brakes were so greasy and the tracks were so wet that the car slid rapidly down the hill. On reaching Kearny street, where the track was sanded, the brakes held fast and the car was stopped.

"We are going to put a stop to all that sort of thing," said the superintendent. "We are having sand boxes built on each dummy, and they will be placed under each seat, with a pipe extending from them to the track. Whenever the rails are slippery, the gripman can easily sand them and make the brakes hold firmly."

Mr. Harris said that while the sand boxes were being constructed, the signalmen along the line will sand the track regularly during wet weather.

"We are beginning to put up the alarm boxes already," said he, "and will have them all in place soon."

The Humboldt Oil Fields.

A dispatch from Eureka, Humboldt Co., Cal., says: Word has been received from the scene of the oil prospecting near Garberville which gives a most encouraging view of the indications. Work was begun the 6th of February sinking a well ten inches in diameter. The earth was excavated to the depth of 21½ feet, where a sandstone ledge was struck.

Boring was then commenced, but several interruptions occurred from the breaking of the apparatus, which had to be transported a long distance to Scotia for repairs. This necessitated the duplication of most of the machinery, and since this has been done greater progress has been made.

The Humboldt Oil Land Company is prosecuting the work. They worked with only one shift of laborers till the 22d of February, when the force was doubled, and the operations are now proceeding night and day without cessation.

Saturday night the well had been sunk 300 feet, and yet the nature of the rock had not changed. Through this whole distance the substance is soft, oil-yielding sandstone. Superintendent Giffelin says the evenness of strata and the extent to which it is impregnated with oil is remarkable, and something beyond what he had ever seen. The oil is pumped out with the water, and so favorable are all the indications that those interested are becoming more confident, and the whole community feels greatly encouraged.

The walls of the well remain intact. Before the well reaches a depth of 400 feet the size of the bore will be changed from ten to eight inches, and at the 50-foot level to six inches.

THE HIGHEST RAILROAD BRIDGE in the United States is the K'nzua viaduct on the Erie, N. Y., railway—305 feet high.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

BELMONT.—*Ledger*, March 5: The ten-stamp mill at this mine is running steadily on surface ore. Several noted improvements have been made, the most prominent being a building, 30x50 feet, and horse-power hoist erected over the Boss shaft. The company will soon substitute steam, as the water is too strong for their present power.

MISCELLANEOUS.—The ten-stamp mill of the McAtto mine, near Wieland, is to be taken down and added to the Clinton Consolidated, which will give the latter a capacity of 30 stamps. The ore body at the present increased depth is said to warrant this enlargement. It is reported that the drift in the lower level of the Wildman encountered the ledge last week, 70 feet nearer than was anticipated. This encourages the hope that the ore body has widened out considerably at this depth. The rock is said to be of good quality, equal to any heretofore encountered. We earnestly hope the good news is true. The cleanup at the Mahoney mine last month is said to have been \$1000 better than the month previous. Rumors are afloat that the litigation between the English and American stockholders of the Amador gold mine has been settled, or rather that a basis of settlement has been agreed upon. The American company, it is claimed, will probably secure control and manage the concern, as soon as everything is settled. This will be cheering news for the creditors, as there is something like \$14,000 due to parties in Amador county, not to mention the outside debts, which amount to even more than this.

El Dorado.

By ELECTRICITY.—*Placer Republican*, March 2: Arrangements are being perfected to light and run the Idlewild mine, two and one-half miles from Greenwood, El Dorado county, by electricity. Three dynamos and the necessary machinery have arrived at this city for the above-mentioned purpose. The drills and all machinery will be run by electricity. It is claimed that they can mill all ore at the low cost of 40 cents per ton. This mine is familiarly known as the old Taylor mine. Electricity is now used in the St. Lawrence and Dalmatia mines.

VAN.—*Georgetown Gazette*, March 4: Only the pump on the Van mine is now running.

PLACERS.—The unusual amount of gold dust sold in town during the past week shows that placer mining is picking up.

DARLINO.—*El Dorado Republican*, March 3: The mill at the Darling mine was shut down temporarily a few days ago for the purpose of putting in concentrators. Crushing will be resumed as soon as this work is completed. The miners formerly employed in the Landecker mine, having filed liens on that property to secure wages due them, have commenced an action against the proprietors. J. B. Polk came down Friday from the Philadelphia and Gold Note mine. Mr. Polk exhibited some very rich ore from that mine and reports about 200 tons on the dump.

Mono.

BODIE CON.—*Bodie Miner*, March 4: Upraise No. 1, above the 500-foot level, Jupiter shaft, was extended 7 feet. The ore in this upraise is about 6 inches wide. We will start the mill on Bodie ore next week, or as soon as we get through cleaning up from Bulwer run.

Mono.—During the past week, north drift from No. 1 upraise, 100 feet above the 700-foot level, was extended 7 feet, and connection made with No. 2 upraise for air. The seam of ore in this drift is very good. Started to upraise in No. 1 and extended the same four feet; total distance from the 700-foot level, 110 feet. The seam of ore in the face is good but small.

Nevada.

ST. JOHN MINE.—*Grass Valley Union*, March 4: The work in the St. John mine, which has been steadily prosecuted for the past year or more under Superintendent T. H. Moore, has been making an encouraging showing for some time past, and the company is so well satisfied with the prospects that it has purchased the new mill on the Murchie mining property in the vicinity of Nevada City, which was erected some years ago, but was not operated for any great length of time. This mill has ten stamps, four Frue concentrators, steam machinery, and all the necessary fixtures. The work of removal and rebuilding will be commenced next month, and the mill will be set up a short distance below the St. John hoisting works, where the ground is favorable, and where there will be sufficient fall for ore shoots, rock breakers and self-feeders, which will ensure the convenient handling and cheap reduction of the ore. The shaft of the St. John mine has been sunk to a depth of 233 feet, from which a drift has been run 150 feet west on the vein, which now shows on the face a width of from six to eight feet. In all there have been 300 feet of drifts and crosscuts run, but no stopping has been done, as the quartz has been left to be taken down when the mill is ready. There are now on the dump 250 tons of quartz, which amount will be considerably increased by the time the stamps are ready to drop. All the quartz shows largely in sulphurets and galena, and prospects fairly in free gold, but it is not high-grade milling ore. The ledge is so large, however, and can be mined and milled so cheaply, that \$6 ore will be a paying proposition. The sulphurets give large assays, and are in such quantity that they will add materially to the bullion output of the mine. All appearances go to show that as depth in the mine is attained the vein will be more regular and its size maintained or increased, as it does

not, at present depth, entirely fill the fissure between the walls. The wall rocks are highly mineralized, which is an encouraging sign, and the belief is that the vein is in the same fissure as the Idaho mine, as the hanging wall rock is precisely of the same character. The stock of the St. John mine is largely owned in San Francisco, and a portion of the stock is also owned in Chicago and St. Louis. It will yet prove a great mine, unless all appearances are deceptive.

BULLION SHIPMENTS.—*Nevada Transcript*, March 3: The Citizens' Bank made a bullion shipment amounting to \$15,000 about the first of the week, and to-day they sent off another bar of the yellow stuff worth \$3000. The gold is the result of partial cleanups from mines in this district. This is the sort of fruit that Nevada county produces, and she has the whole world for a market. When the hydraulic mines are again running in full blast, there will be a great increase in the bullion shipments.

MINE PURCHASES.—*Grass Valley Telegraph*, March 4: For some months past the Nevada County Improvement Association has been working the Peabody mine under a lease. Recent developments in the mine have so encouraged the company that they have purchased the mine outright. A steam plant, consisting of hoisting and pumping machinery, will be put on the mine immediately, and it will be sufficient for all workings and will be the very best that money can buy.

ORLEANS.—A crushing of 14 loads of rock from the Orleans mine has just been put through the Rodgers' mill. The result was a yield of \$44 per load, which is \$7 ahead of the last crushing made. The ledge is looking well and work will be pushed ahead as fast as possible. The Rodgers' mill will soon begin the work of crushing ore from the Merrimac mine.

HERMOSA.—*Grass Valley Union*, March 4: The shaft of the Hermosa mine has reached a depth of 500 feet, and the directors have let contracts to run 50 feet each way to open up a new level. Upon the completion of these contracts, others will be let. If a pay shoot is struck, there will be extensive backs to be opened. The vein, as shown in the shaft, looks fairly well, and the company feels encouraged that in drifting something better will be found. The work in the mine has been diligently prosecuted, while the company has been kept on a sound financial basis all the time.

FAST MINING WORK.—*Grass Valley Union*, March 6: The *Union* of Thursday, in giving an item of the rapid progress made in sinking the shaft of the North Star mine, intended to say that 44 feet, 8 by 18 feet, had been sunk in one month, but the types got mixed and said 24 feet, but even those figures were not high enough, as Superintendent Abadie informs us, as the distance actually sunk from January 6th to February 6th, 110 single shifts working was 55 feet. He says the merit of the work is due to James Seymour, Thos. Tippet, W. C. Carter and Mr. McIvor. This, Mr. Abadie claims, is the best record in shaft-sinking that has been made in Nevada county, when taken in connection with the fact that all other underground work went on as usual, the 40 stamps being kept supplied with quartz raised from the mine.

SIGNIFICANT SALE.—*Tidings*, March 2: The Oro Flat mining claim at Boston Ravine, embraced within the Massachusetts Hill quartz mine, and believed to be one of the most valuable properties in the district, was sold by the Sheriff to-day to satisfy a judgment of \$36,003.91 and costs and interest. Mr. Whittaker Wright, a Philadelphia mining man, originally obtained the judgment, which he transferred to Charles Peyser of San Francisco, who in turn transferred it to L. Gilson, one of the principal owners of the Omaha & Lone Jack and Gold Hill mines of this district. Mr. Gilson to-day bid in the property for the amount of the judgment. The purchase by him is regarded as very significant.

BRUNSWICK.—*Tidings*, March 2: Supt. Fitzgerald reports renewed improvement in the ledge in the Brunswick shaft. He says the ore is the best the present company has found. A new and likely-looking ledge has been cut in the 400 level of the North Banner mine, in the hanging wall. It will require a few days to ascertain its value.

WYOMING CON. M. Co.—The directors of this company organized Wednesday evening by electing B. F. Rannels as President and W. E. Parsons as Secretary. The Citizens' Bank was made Treasurer. It was resolved to let a contract to sink the incline 50 feet. Fifty feet is about the present perpendicular depth. The water will be out by Monday and the mine opened to inspection by persons contemplating bidding for the contract.

KING SOLOMON'S MINES.—Operations on the King Solomon's group of mines near the Delhi have been in progress throughout the winter and tunnels have been advanced. Some specimens of the ore cut lately have been brought here. They show well in free gold and other likely mineral. Development is alone necessary to open up one of the biggest mining properties in the State.

GOON CRUSHING.—*Grass Valley Telegraph*, March 8: A crushing of 13 loads of ore from the Lafayette mine was completed at Joe Southern's mill on Monday. The result was a yield of 39 ounces of retorted gold and \$6 over. This does not include the sulphurets, which are rich. The gold from the mine is worth \$161 per ounce. The last crushing came from the tunnel where it taps the ledge at a depth of about 200 feet from the surface. The Lafayette is easily worked, and all of the crushings taken out have yielded most satisfactorily.

GRANITEVILLE.—*Nevada Transcript*: Myer & McPherson own the Blue Cloud, adjoining the Rocky Glen. They have been running a tunnel all winter, and have good rock, worth \$14 per ton.—Philip Hipert has good prospects in the "Old Dillon," adjoining the rocky Glen on

the south, the rock taken out going \$7 50 per ton.—Mr. Shepp has a good vein adjoining the Dillon, his last crushing paying \$52 per ton.—Parsons & Maybanks have some good properties, but for want of capital they are now lying idle.—The Ozali Brothers have been running a tunnel all winter, and have just cut a three-foot vein which shows free gold.—John Hipert and son will resume work on the old Liberty mine, but will have some hazardous work in tapping a very large body of water under sixty-five feet head.—Thomas staples and his boys are ground-slucing on Poorman's creek.

Placer.

ABOUT WASTE DUMPS.—*Herald*, March 5: Hawkins and Monahan have made another crushing of rock which they sorted out from the Eclipse waste dump and this time they realized about \$30 a ton. Their previous crushing from the same source yielded \$63 a ton. B. F. Hartley, who has a Hunter mill running on rock assorted from the waste dump at the old Crater mine is doing so well, we understand, that he proposes as soon as he can get at it, to duplicate his plant. The fact that these waste dumps are yielding so well is proof that the mines have been operated carelessly or that there is something radically wrong with our system of mining.

Plumas.

GREEN MOUNTAIN.—*Plumas Co. Bulletin*, March 3: W. N. Goodwin and S. W. Cheyney visited the Green Mountain mine Monday, returning here Tuesday. In the face of No. 6 tunnel a fine body of quartz is reported. Twenty stamps of the mill are now running. The mine is getting into good condition as fast as possible. An enormous amount of work has been done, and at small cost. A new tunnel has been driven around the Blake chute, in tunnel No. 5. The work of opening up this level will be pushed with all possible speed. The visitors were much elated over the prospects of the mine, whose possibilities as a mining proposition are rarely equaled.

EAST BRANCH.—*Plumas National*, March 6: Mr. R. Beldon, who was up from the East Branch Friday, gives us the following news: Mitchell & Beatty, on Willow Bar, will start their elevator in a few days. They have a good mine and have taken out considerable money. Odneal and Beldon, who have a quartz location on Mill creek, will resume work in a short time in their lower tunnel. By running about 100 feet farther, they think the ledge can be tapped at considerable depth.

THISTLE SHAFT.—Eighty men are now employed by the company. Four shifts of men are being worked.

LA PORTE.—The plentiful supply of water will enable those engaged in ground slucing at La Porte to secure quite healthy cleanups.

Sacramento.

PROSPECTING AT FOLSOM.—*Grass Valley Telegraph*, March 8: John T. Cardwell is prospecting for gold in gravel on the flat opposite the town of Folsom, Sacramento county. He is boring holes so as to ascertain the lay of the body of gravel, and when he finds out about that he will run in a tunnel, through which the gravel will be taken. It will require very many borings to give the knowledge sought for. It is a good idea, that of drilling into such ground before sinking expensive shafts or driving costly tunnels.

San Diego.

JULIAN AND BANNER.—*Sentinel*, March 3: Two more consignments of pipe passed through Julian the past week en-route for the Ready Relief mine at Banner. The water system for which this pipe is intended is developed at an altitude of 800 feet above the mill where it is to be used, and falls through a six inch pipe for a distance, then is contracted to a five inch pipe and at the exit comes out of a three-quarter inch hole against the buckets of the wheel with the force of a cannon ball.

The new boiler at the Helvetia has been put in place and fires were started under it Monday in order to dry out the masonry. A few days will suffice to complete the work, when the stamp mill will again be put in operation. A large amount of ore is on top awaiting the stamps, while great bodies of good ore are in sight below.

The Ruby Co. has been uncovering some very fine ore within the past few days in the old Wilcox mine. The vein averages eight inches in width and is holding up well. This company now works 14 men.

The engine and new hoister for the Cincinnati Bell was hauled up Saturday and will be placed in position at once. This valuable property will then be in better shape than ever to show up its vast resources.

James Courtney and Mike Flatley are still at work on the Padlock.

Shasta.

LADY MINING EXPERTS.—*Shasta Co. Democrat*, March 2: The miners of Old Diggings were treated to quite a novelty the latter part of last week. It was the visit of three ladies to that locality, who were there to expert some mining property which they contemplated purchasing. One of these ladies, Mrs. Newlands, is the sole owner and operator of three mines, in one of which she is now working 200 men. She is considered as being one of the safest mining experts in the business.

THE NEW RENOVATION PLANT.—*Shasta Co. Democrat*, March 2: Mr. Patrick Marley of Idaho, in company with Geo. Yount, and his two brothers of Napa county, and Thos. B. Dozier Esq. of this city, have formed a co-partnership for the erection and running of a roasting and chlorinating plant in the South Fork mining district. The company is styled the South Fork Milling Company, and it proposes to do custom work for the miners in South Fork district. Mr. Marley is an experienced man in his business. He has a patent on a new roasting furnace, which he

claims will produce better results on all classes of refractory ores than any other furnace now in use. Mr. Geo. Yount is an experienced assayer and millman, and the two working for the success of this enterprise will undoubtedly make it a success. The plant will have a capacity of reducing 12 tons every 24 hours, and the company expects to have it running inside of 90 days. A large force of men was put to work last Friday excavating for the plant. We have implicit faith that Mr. Marley will work the silver ores of South Fork district up to a high per cent, and we believe he is the man the miners of this country have been looking for years. We were over in South Fork two days last week, and to say that we were surprised at the prospective mineral output in that camp hardly expresses it. If this plant handles the ore successfully it will develop a silver camp second to none on the coast. We saw richer prospects, more of them and more high grade ore than we ever saw before in any district we have visited, and we predict that in a very few months South Fork will boom as never any camp in this part of the State boomed before.

Yuba.

SMARTSVILLE.—*Grass Valley Tidings*: The old Wheaton mine at Smartsville has been closed down for the present, and about 45 men are out of employment. A slide of earth falling on the machinery was the cause of stopping the work.

PERSISTENT PROSPECTORS.—*Grass Valley Tidings*, March 2: Messrs. German, Trood, Crall, Radford and others of North San Juan and Bloomfield, owners of the Orient drift gravel mine above Camptonville, expect to cut the channel in a few weeks. They have been prospecting for 12 years, and steadily for the last four years. One tunnel was run in 1100 feet and was found to be too high; then a shaft was put down, and now a tunnel lower down is in 1050 feet. Prospects of gravel obtained are full of promise of a rich reward when the channel is cut. It is believed by many that the channel is identical with that of the rich Bald Mountain Extension.

NEVADA.

Washoe District.

ON THE LONE.—*Virginia Enterprise*, March 3: There are no marked developments to report at any point on the lone at present. The usual drifting and crosscutting is going on at both ends, but there are no indications of anything important in the way of an ore body on the boards just now. The joint Sierra Nevada and Union west drift is out something over 1700 feet west of the shaft and is being pushed farther in that direction all the time. The north drift from the Kenosha tunnel in Sierra Nevada ground is being advanced steadily northward. Both drifts are in porphyry. In the South End group of mines fair grade ore is still being taken from the upraise from the 1300 level of the Belcher, and the recently started north drift from the bottom of the raise is encountering bunches and streaks of good ore. Bunches of rich ore are being developed in the raise from the 650 of the New York also. The joint Savage and Gould & Curry north drift is heading for ground where there is a likelihood of an ore body being developed. The point is some distance ahead yet, but there is an opportunity for a development of ore in the middle ground. There are stringers of quartz in the face at present. Following is the official report of the pumping operations in the Crown Point incline for the week ending Feb. 27, 1892: The 1700 station pumps have been working continuously during the week, the flow of water being about the same as at last report. The work of cleaning out the 1700 south drift is making good progress and is now opened out 650 feet from the station. The pumps are running now simply to keep the water below the station until 1700 south drift is cleaned out. The compressed air power is not sufficient to run the station and sinking pumps at the same time. It is necessary, therefore, to replace the compressed air by steam in the operation of the station pumps in order to reduce the water below this point.

OVERMAN.—Extracted from 1000 and 1100 levels 365 tons of ore. Car samples average \$20.17 per ton. Shipped to Brunswick mill 369 tons of ore. The average battery assay was \$16.06 per ton.

ALTA.—We commenced tanking water on the 21st inst., and have continued uninterrupted ever since. The water stands this morning 35 feet below the 1350 station, and if we meet with no serious setback, will reach the 1550 pump in ten days, when the necessary repairs can be made quickly and pumping resumed.

BELCHER.—The north drift from the bottom of the raise, 300 level, has been advanced 33 feet during the week, and is now out a total distance of 104 feet; face in porphyry with streaks of quartz through it yielding low assays. We are still working north from the 1300 level stope, and are now out ten feet on the 6th floor; face in quartz containing spots and bunches of good ore. Shipped to the Vivian mill during the week for reduction 154 tons 854 pounds of ore, the average battery assay of which was \$22.93.

KENTUCK.—The north drift from the Crown Point west crosscut, 160 level, was advanced 21 feet since last reports, and is now out a total distance of 113 feet; face in porphyry with small streaks of quartz running through it containing some fair-grade ore.

SEG. BELCHER.—The south lateral drift, 1300 level, has been repaired for a distance of 100 feet during the week, and there is still about 50 feet left to retimber before reaching the south line.

CROWN POINT.—The raise from the south drift from No. 3 east crosscut, 500 level, has been extended 31 feet during the week, and is now up 127 feet; top in a mixture of low

grade quartz and porphyry, with a little water running from it. The south drift from the west crosscut, 600 level, was advanced eight feet during the week, making its total length 85 feet, and stopped in porphyry. At a distance of 75 feet in a west crosscut was started from it, which is now out 16 feet; face in porphyry.

IMPERIAL.—We are taking out some ore from the old fillings on the upper levels.

YELLOW JACKET.—Shipping 50 tons of ore per day to the Brunswick mill.

CONFIDENCE-CHALLENGE.—The joint Confidence-Challenge west crosscut from the north drift, 200 level, is out 74 feet, 23 feet having been made during the week; face in quartz and porphyry. The joint Confidence and Challenge east crosscut, 300 level, is out 64 feet, 24 feet having been made during the week; face in porphyry.

JUSTICE.—The west drift, 490 level, was advanced 15 feet during the week, and is now out a total distance of 670 feet; face in porphyry. The north raise, 322 level, was advanced 12 feet during the week, making its total height 117 feet; top in porphyry streaked with quartz.

HALE AND NORCROSS.—On the 900 level of the north upraise, 32 feet south of our north boundary, is now up a total distance of 50 feet, and continues in quartz giving low assays. From the south upraise from this level we are extracting some fair-grade ore from and above the 6th floor. On the 1630 level we have temporarily discontinued work in west crosscut No. 2. West crosscut No. 3, started from the face of the north drift, is advanced 20 feet in low-grade quartz. We are doing considerable prospecting in different parts of the mine. There is no change of any importance in any of the drifts or crosscuts of the mine. During the week we have hoisted 415 cars of ore from the 900, 1100 and 1450 levels; average battery assay, \$23.37. Bullion yield for the week, \$6875.

SAVAJE.—During the week we have hoisted 811 cars of ore from the 750, 950, 1150, 1400, and 1500 levels; shipped to the Nevada mill 6324 tons; milled 632 tons; average battery assay, \$20.50. Bullion yield for the week, \$9895. On the Sinto Tunnel level, the joint west drift with the Gould and Curry Company was advanced 17 feet, making its total 190 feet; face in porphyry and stringers of quartz giving low assays.

SCORPION.—Since we resumed work from the joint drift from the 900 level of the Union shaft the drift has been advanced 40 feet, making its total 702 feet. The course of the drift is now 45 degrees west of north.

Wild Rose District.

IN START UP HIS MILL.—*Silver State*, March 3: Nick Frayer, the irrepressible, will start up the Cliff mill about the 15th of this month. The first run will be made on ore from the Bullion mine, the leasers of that mine having about 400 tons of high-grade ore on the dump. The mill has a capacity of about 20 tons daily, and as it has both concentrators and pans the ore is worked to a very high percentage. The Cliff mine is looking fine, and regular shipments of concentrates from Spring City will undoubtedly soon be made, reminding one of the times when the famous Paradise mine was at the zenith of its productiveness.

Tuscarora District.

BELLE ISLE.—*Times-Review*, March 4: The crosscut from No. 1 vein, 350-foot level, extended 11 feet. North intermediate drift on No. 3 below the 350, extended 10 feet. South drift, same place, extended 10 feet. The crosscut from No. 1 upraise extended 15 feet. Hoisted 9 cars second-class ore.

NORTH BELLE ISLE.—East crosscut south, 400-foot level, extended 2 feet. West crosscut, north end of No. 3 drift, same level, extended 10 feet. North intermediate above the 500 foot level extended 17 feet; still in good ore. No. 4 drift south, 500-foot level, extended 18 feet. Hoisted 42 cars concentrating ore.

NORTH COMMONWEALTH.—Second level—East drift from winze advanced 10 feet, producing 21 cars of ore, assay \$45 per ton. No. 1 raise from north intermediate drift put up 33 feet, top in vein matter.

DEL MONTE.—Second level—Joint raise stopes produced 10 tons first-class ore, assay value \$275 per ton. West drift from south line extended 35 feet.

NEVADA QUEEN.—Second level—No. 1 and 2 ore chutes have been placed in No. 1 south drift, and No. 3 raise put up 14 feet through very hard porphyry. It is better breaking in the top; about 10 feet to the vein.

ARIZONA.

HARQUA HALLA.—*Prescott Courier*, March 4: J. W. Cover and J. D. Helm returned from Harqua Halla yesterday, and from them the *Courier* learns that during their visit to the Bonanza mine a gold bar was cast weighing 3224 pounds, avoirdupois, valued at \$82,000, the product of a 42-days' run of the Bonanza mill. The shipment preceding this one was a 172-pound bar. The former is certainly the largest bar of gold ever cast on the Pacific Coast, or probably in the United States, the next largest known being one of \$70,000, in California. [The *Courier* is misinformed. Several larger bars than this have been made. The Spring Valley gold mine, Cherokee Flat, Butte county, Cal., made one valued at \$90,000 some years ago. One was made at Helena, Montana, a few years since valued at \$100,000. It came from the product of three mines. The biggest ever made was that of the North Bloomfield gravel mine, Nevada county, California, in 1882. It weighed 5113 pounds troy, and its value was \$114,000—not \$70,000, as the *Courier* states. This was from a single cleanup of the North Bloomfield mine, which that year yielded \$1,000,000 in gold.—*Ensign Press*.] These heavy bars are made to avoid risk of robbery by highwaymen. During seven and one-half months the mill has produced \$320,000. This mine bids fair to equal the famous Vulture mine, which

it closely resembles in character of ore and in the nature of the deposit. The owners are Hubbard & Bowers. The entire management is under the entire supervision of Mr. Hubbard, who, with his thorough knowledge of mining and milling and rare business ability, has reduced the cost of production to a minimum. There are 2000 tons of ore broken in the mine, and enough blocked out and in sight to run the mill six months. Arizona now has the largest and best paying gold mine on the Pacific Coast.

THE SENATOR.—*Journal*: The Senator mill and mine are running day and night shifts. About 40 men are employed in the mine at present. Only ten stamps of the mill are running yet, but the other ten will be started up in a few days, when the force in the mine will be increased. T. A. Conlee, who is working the Johnson mine at Stanton, came in recently, bringing samples of ore with him. The mine is opened up by a tunnel on the ledge for a distance of 200 feet. The vein is six feet between walls, both of which are well-defined. It carries from 14 to 3 feet of high-grade gold sulphurets, the balance of the vein being free-milling ore, which will mill from \$8 to \$10 per ton. Mr. Conlee is well satisfied with the property as far as developed, and will leave for the East soon to purchase a mill to work the ore. W. W. Vanderbilt visited Lynx creek, and says that Supt. Messicks and his assistant, Mr. Swan, started the Lynx Creek Hydraulic Works with a full head of water. Both giants were put at work washing down the mineral-bearing gravel beds, owned by the company. Twenty men are employed under the superintendence of an experienced hydraulic engineer. The reservoir has been built up during the past summer, and its capacity increased to about four times what it previously was.

DAKOTA.

SOLD SOME PROPERTY.—*Deadwood Pioneer*, March 5: William Quigley, of Big Bottom valley, arrived in Deadwood yesterday morning, spent the day here, and went home in the evening possessed of \$15,000 more ready money than he had on reaching Deadwood. The cash was acquired by transfer of his interest in the May and Custer lodes, adjoining the Big Missouri property, to the Big Missouri Company. Henry Robinson, of this city, is said to have also realized \$8000 by parting with his holdings in the same claims. Messrs. Baxter and Coffin's interests will probably be transferred to the company in a few days.

BOUGHT SOME GROUND.—A deal was closed up late Monday night, by which J. G. Keith's half interest in the Katie and Annie lodes was transferred to the Keystone Chlorination Company, which already owned the other half of the property. The purchase price has not been definitely stated, different rumors placing it at from \$25,000 to \$50,000. Keith acquired his interest only a short time ago, and turns a pretty penny by the deal, whether the greater or lesser sum was paid. The property is well developed and shows an immense body of \$35 gold ore, that is now being treated at the Keystone chlorination works, Garden City. It is currently reported that the money obtained on mortgage by the Golden Reward Company a few days ago, will be partly used in purchase of the Tony and Lundt group, the property owned by the Isadora Mining Company, at Bald Mountain. The Tony and Lundt property is now owned by a syndicate, willing to transfer it to the company for a very reasonable advance on the \$85,000 paid for the mines a few months ago. A handsome gold brick valued at \$14,000 was brought from the Golden Reward chlorination works, and deposited in the Deadwood National Bank last evening. The brick was the result of operations for last half of the short month of February.

IDAHO.

"AS RICH AS BLAZES!"—*Silver City Avalanche*, Feb. 27: Rumors were flying around town Thursday that an enormously rich strike had been made in the Phillips & Sullivan mine, and the mining reporter interviewed Mr. Phillips in regard to the same. He said in substance: "The Belfast crosscut, which we have run some 620 feet, has cut the vein, and although we have run 14 feet across the same, have not yet found the hanging wall. This strike is about 100 feet deeper and 30 feet south of the point where we had worked above, making a large block of rich ore to work out. The vein lies between porphyry walls and is mixed with a talc similar to that found above. I brought down samples yesterday for assay, which will be made to-day, but not in time to give results in to-day's issue. I prospected some of the rock a few days, which run high in gold. The mine looks better to-day than ever, and I am sorry we ever gave a bond on it." Next week, the width of the vein will be ascertained and the value of the same known.

BLAINE TUNNEL.—Work goes on with a monotonous regularity, and an average of eight feet every 24 hours is made. The main difficulty is in keeping the waste rock away from the air drills, as the tunnel is of such large dimensions. The large cars and double track alone makes it possible.

FLORIDA.—Harry Sullivan, John Herndon and Barney Matteson are still pounding away at their property on this mountain, and as soon as the roads are opened, will have another lot of ore milled. This is a new discovery, but a test run of about 25 tons, which was just made before the roads were blockaded, showed they had ore which would furnish the owners with a World's Fair stake.

MONTANA.

BUTTE NOTES.—*Montana Mining Journal*, March 2: Nuss, Sullivan & Co. are doing good work on the Mountain Chief, and will make a

cleanp sure.—John McCrimmon & Co. have taken a ledge on the Cora mine east of the Lexington and are taking out some good ore.—Desautel & Heinze are taking a vast quantity of good copper ore from the Ramsdell-Parrot, on which they have a lease.—The shaft of the Ophir, south of the city, has reached a depth of 250 feet. Ore is being extracted from the upper workings however, while the work of exploration is in progress below.—The Belle of Butte, at Walkerville, from which the silver Bow mill has been getting its supply of ore, has been closed down but the mill is kept running on ore from the Orphan Girl, on which the company is now working.—Colonel J. O. Hindnutt is working the Czarina, and is getting some 150-ounce rock from the vein, which is from two and a half to four feet in width.

BOULDER DISTRICT.—*Montana Mining Journal*, March 2: Dr. Johnson returned yesterday from a visit to the Mountain Key above St. Louis in Jefferson county. The crosscut tunnel is in 94 feet and will soon reach the vein. High-grade ore is being sacked from the shaft and a shipment will soon be made. Sinking in the Champion is going on as rapidly as possible, although the anticipated headway is not being made. Frank Finney has 20 inches of fine galena and carbonate in the bottom of a 20-foot shaft on the Siota mine, Amazon district. The property is a very promising one. Hines, Walters and DeLodge are getting ready to place machinery for development purposes on the North Boulder lode, North Boulder district. The claim is a very promising one, and will likely pass into the hands of capitalists at a handsome figure. Parties prospecting on a claim in Amazon district, near the smelter and between the railroad tracks, are said to have a foot of solid galena at a depth of only 15 or 20 feet.

SUSPENDED MINES.—*Inter-Mountain*, March 5: Notwithstanding it has been repeatedly stated, by what was supposed to be good authority, that there was nothing new in the situation at the Moulton, it now transpires that half the stamps in the Moulton mill have been hung up for about a week for want of ore. The Moulton is a 40-stamp mill, and depends largely upon custom ores for its continued operation. The lessees who have been furnishing the mill with ore have refused to longer sell at the present price of silver, hence the shut-down. It is said that only ten men have yet been laid off, but that the entire force will be discharged and the remaining 20 stamps hung up in the near future unless the company can secure sufficient ore to keep the entire plant running. The Four Johns mine, which adjoins the Black Rock, was closed down Monday by Loeber & Nickel on account, so says Judge Loeber, of the low price of silver. Twenty men were laid off at the Vulcan mine Monday night, the reason given being that the low price of silver would not justify the working of a full force.

SUNNAY NOTES.—*Inter-Mountain*, March 5: Hoisting machinery is being placed on the Snohomish by the Butte Copper Co. Nuss, Sullivan & Co. are doing good work on the Mountain Chief, and will make a cleanp sure. Fifty-eight bars of bullion of an estimated value of \$82,000 were shipped by the two express companies during the week. Desautel & Heinze are taking a vast quantity of good copper ore from the Ramsdell-Parrot, on which they have a lease. The Anaconda Co. is pumping water from the North Star mine near Walkerville for use at its various hoisting works.

DRY WIND.—*Montana Mining Journal*, March 5: Work is steadily progressing on the Cleopatra group. Ed Moore is working on the Bullion Queen, running a tunnel on a ten-inch seam of solid lead ore, which runs high in silver. One very important strike has been made on the Blue lead by Nelson Jensen. He struck the lead in his crosscut tunnel at 160 feet in depth. The vein is 16 feet wide and will pay in free gold. J. B. Williams is working on his new discovery, the Flint lode, which, although a fine showing, is rightly named, for the rock is as hard as his own quartzite pie crust.

NEW MEXICO.

STEEPLE ROCK REDIVIVUS.—*Southwest Sentinel*, March 4: For some time past, rumors of the sale of the Jim Crow and Imperial mining properties have been rife in the community, and, as is well known, a few of our nifty young men, including Charles I. Davenport, R. P. Barnes, Allan H. Macdonald, J. E. Hussy, A. H. Nichol and W. C. Davenport, have been working the property under a lease and bond from the owners—R. T. Bailey, H. C. Boone, B. B. Adams and D. Boone. It now transpires that under an arrangement with the lessees, J. M. Wright, Esq., and Prof. W. Geo. Waring of this city have been working up a sale, and have succeeded in placing the property with a wealthy Pittsburg syndicate for the sum of \$150,000, besides a stock interest retained by the two promoters. If the chute of ore which has continued from the grass roots to the bottom and through every part of the workings of the mine shall prove permanent, a half million dollars is a small price for the property. The mine stood the test of the most rigid examination and survey and a complete sampling and analysis of its ores, and had a smaller strike been made in Creede Camp or Cripple creek at the same time the Jim Crow was discovered, a busy city of 10,000 people would now be engaged in developing the resources of the camp. We have noticed that when a strike is made in Colorado, it is advertised in such a way as leads to the exploration of the entire region round about; but in Grant county if a man sells a mine for a few thousand dollars, he is called a "lucky dog," a "shrewd fellow," etc., the idea being that anything you get for a mine or prospect is clear gain, regardless of the fact that the development of our millions of gold and silver constitutes almost our only means of progress. We think that of all laborers none is more worthy of his hire than the miner, the

prospector, the promoter. We believe our mines are as good as those of Colorado or any other State or country. All they need is fair play, and we are pleased to learn that the Imperial, Jim Crow property, is to be developed by the most improved mining methods.

TALL PINE.—*Cor. Silver City Enterprise*: Owing to an abundance of water in the gulches in the immediate vicinity, a large number of Mexicans and several gentlemen of leisure have been doing very well "rocking" to the tune of—well, enough to buy grub with and more too. The Bell & Stephens mill has been running on ore from the Santa Rosalia, formerly the Golden Rule mine.

A number of new mining ventures are talked of, which, if started, will help to improve the camp, more of which anon.

The Pinos Altos amalgamator owned by Long & Robbins is doing good work on the tailings from Bell & Stephens' mill. It has only been running about twenty-four hours, and is saving 97 per cent of whatever gold escapes from the vanners. Mr. Long, the inventor, informs me that, with some few improvements, which will be made, he is sure of making his machine a grand success;

OREGON.

NEW MILL.—*Seattle Mining News*, March 3: The new custom mill to be erected at Ruby city is now an assured fact. The Washington Reduction Co. has secured a site for the mill at the south end of town, near the large tunnel into the Ruby mountain, and has agreed to have 40 stamps ready to run by July 1st. This was the one thing needed to assure the rapid development and consequent prosperity of the mining and all other interests of that rich district.

THE MINING OUTLOOK.—*Ellensburg Capital*, March 3: The season of 1892 promises to be a very prosperous one for the mines of this State, and it is probable that the greatest advances will be made in all directions. While we are interested in the development of mines all over the State, which means general prosperity, we are more particularly interested in those at home, which are daily becoming more favorably known and which are attracting outside capital and energy. The heavy fall of snow in the mountains this winter insures plenty of water, which is so essential to the prosecution of successful mining, and as soon as the season opens a great deal of work will be commenced on the Swauk and Peshastin districts, than which no richer regions are now known in the State. Already inquiries are being made in regard to properties there. There is already one mill in the Peshastin and it is likely that one or more will be working on the Swauk before the summer is over. Capital is needed and a splendid income awaits the parties who will put up the mills. A great deal of placer mining will be done as heretofore, and there will be much more prospecting done than ever before. Our county should and no doubt will be known in the near future as the banner mineral producer of the State.

UTAH.

STRIKE IN THE MEEARS.—*Park Record*, March 5: It now transpires that the strike of 18 inches of ore, reported in the Mearns shaft last week while cutting a station on the 500 level, was correct, in spite of the strenuous denial at headquarters. It seems, however, that the denial was based on the fact that the ore was not in the shaft exactly, but a few feet from it, and that the local superintendent didn't know whether Mr. Mearns wanted the news to reach the outside world or not. The *Record* was positive its information was correct, but, through courtesy, did not like to say so. Everybody knows what the Mearns and the Daly West are after, and knows it is only a matter of time until it is found, and as the ground is all patented and belongs to strong companies, it is hard to understand the necessity for trying to always mislead the public.

LEASED THE CREOLE No. 2.—Martin McGrath and associates have leased the Creole No. 2 from E. W. Berry, D. F. Condon and M. S. Ascheim, and will soon commence development work on the same through the shaft they have sunk on the Typo. The actions of Mr. McGrath would indicate that a good body of ore has been found in the Typo, though the soft impeachment is denied. The fact that a controlling interest has recently been purchased in this property, and a lease on the Creole No. 2, which adjoins it on the northwest, certainly looks as if there was method in the manipulation and that something besides indications was at the bottom of the transactions.

NO PERCEPTIBLE EFFECT.—When the large volume of water was first encountered in the big Ontario drain tunnel, it was thought the large scope of mining ground to the east and south would certainly be drained of water, but to date, though the flow in the tunnel has held its own, there has been no diminution in the quantity of water found in the district mentioned, and the relief anticipated is yet to come if it comes at all. There are undoubtedly some big mines in that part of Blue Ledge, if depth could only be obtained, but the water still prohibits sinking and tunnels are the only method by which the country can be developed.

ORE AND BULLION.—The Marsac mill shipped nine bars of bullion this week valued at something over \$11,989. The ounces were not stated. Ore hauling was commenced again to-day from the Anchor mine and Union concentrator, but the roads are so bad only light loads can be hauled. The ore shipments this week were confined entirely to the Mayflower, which sent to the market over 988,000 pounds. The Woodside canyon road is the only one now open and it is in a tough condition.

MECHANICAL PROGRESS.

A TRIBUTE TO AMERICA.—Our cousins across the water are becoming more and more appreciative of the skill and energy of American mechanics. The recent interchange of visits between the iron workers of the two countries has had a most beneficial effect. Englishmen are free to acknowledge that they have gained much from becoming more thoroughly acquainted with our men and methods of work. No doubt, much has also been gained on our side; but, so far as the observation of the writer reaches, our people are not as ready to acknowledge the instruction gained by their visits to English shops, as is being done by English visits to our own. The extensive exhibits which will be made by Europeans and our own people at the forthcoming Exposition at Chicago will, no doubt, be an object lesson of great value, and one from which much of practical and mutual value will be derived. We have been led to these reflections by reading the subjoined paragraph from the *Iron Trade Circular* of London and several other similar paragraphs which lie before us as we write: "It is seemingly but a few years ago that we made all the rails that America needed. It was the Welsh rail which linked the Puritan North to the Cavalier States of the South; which crossed the great pampas and wastes, bringing the Mormon under control and helping to subdue the impetuous redskin, and bringing, we may add, the granaries of Chicago and the great industries of Pennsylvania as tributaries to European needs. What do we now make? Not a solitary rail goes from Wales to the States! * * * Ironmasters once thought that the Americans could not make steel rails. They have now beaten our record. We have dreamt that we only can make tin-plate; that there is something in the coal and iron we have different to others. This is only a dream. The shrewd American, a product of the keenest of every land—many expatriated for the fact that their quick brains were not under moral discipline—will be sure to meet home demand with home supplies."

EXPERIMENTS ON THE SOLUBILITY OF METALS.—The insolubility of pure metals in acids has been investigated by Dr. Weeren, a German chemist, who states that chemically pure zinc, as well as many other metals in a state of purity, are insoluble or only very slightly soluble in acids, because at the moment of their introduction into the acid they become surrounded by an atmosphere of condensed hydrogen, which, under normal circumstances, effectually protects the metal from further attacks on the part of the acid. In the experiments which established this conclusion, the amount of chemically pure zinc dissolved by the acid was first determined; it was next sought to ascertain what difference would follow by performing the experiment in vacuo, when, of course, the escape of hydrogen would be greatly facilitated; and under these circumstances the solubility was found to be increased sevenfold. In the final experiment, namely, to learn the effect of introducing into the acid a small quantity of an oxidizing agent capable of converting the hydrogen film to water, it was found that when a little chromic acid was thus introduced, the solubility was increased 175 times, and when hydrogen peroxide was employed, the solubility was increased three hundredfold.

ANOTHER NEW NAIL.—Improvements in nails are still in order. The latest "new nail" is a sort of combined screw and nail, but partakes most of the character of the last-named appliance. The nail is circular, and carries a screw thread, in the form of a very coarse spiral, only once traversing the circumference of the nail in the course of its entire length from head to point. This nail is inserted in the ordinary way, by the aid of a hammer. Its superiority in holding power will be admitted by any mechanic. Thus, if the new nail be driven through two pieces of wood, A and B, in the order named, it would be necessary, in order to tear B from A, that either the iron or the wood screw should be stripped, the other alternative—retrogression of the screwed nail—being practically impossible of occurrence.

A GOLD MEDAL FOR THE BEVINGTON WELDING PROCESS.—J. H. Bevington of Chicago has been awarded the Elliott Cresson gold medal by the Franklin Institute of Philadelphia for his new process for welding and spinning brass and other metals. This process was described in these columns some few weeks ago. It consists briefly in the welding of copper, brass, aluminum, iron and other metals, by forcing them into rapidly revolving dies, where they are softened by frictional heat and united end to end as

in ordinary welding, or forced into one homogeneous mass, as solid as if cast into one piece. Brass and copper may be thus welded, which has heretofore been considered impossible. By this process, tubes of all kinds and of any length or thickness can be readily formed, and the ends of short tubes be as neatly joined as if they had been made in one piece. This process is of wide application, and the patentee is meeting with the most flattering success in its introduction to practical use. The Franklin Institute evidently considers it an invention of great value, as it has never issued but three of the medals named during the past 30 years.

MAXIM OUTDONE.—A new quick-firing Winchester gun, which threatens to dissipate the renown gained by the Maxim gun in the rapidity of its death-dealing capacity, was recently tested at New Haven, Conn. The number of shots ejected per minute was 900. The Maxim machine gun holds the record up to 750 shots per minute. The new Winchester has a water jacket surrounding the barrel, that holds one gallon of water, which is evaporated in one minute when the gun is in operation. In experiments made without the water jacket, the barrel became too hot for safety in less than half a minute. The exploded shells, as they are thrown from the breech, rise about two feet over the gun, and fall in what appears to be a gracefully-curved bar of burnished brass. The gun is the invention of Messrs. Browning Brothers, gun makers, of Ogden, Utah.

CHANGES IN THE DENSITY OF NICKEL-STEEL.—The recent remarkable discovery by Professor Hopkinson of the changes in the density of nickel-steel (containing 22 per cent of nickel), which are produced by cooling to -30° , affords another instance of changes of structure through intense cold. This variety of steel is readily magnetizable when exposed to severe cold, but is not so at ordinary temperatures. Its density, moreover, is permanently reduced two per cent by the exposure to cold; and it is startling to contemplate the effect which would be produced by a visit to the Arctic regions of a ship of war built in a temperate climate, of ordinary steel, and clad with some 3000 tons of such nickel-steel armor. The shearing which would result from the expansion of armor by the exposure to cold would destroy the ship.

ANTIQUITY OF IRON WORK.—Wrought iron was largely used by the Greeks and Romans, and they seem also to have been acquainted with cast iron, although it was supposed to have been scarcely known to them until recent explorations established a different belief. But, as usually occurs when the relative antiquity of any product or device is the subject of debate, the Chinese come in to throw all competitors out of court. In this case, they are credited with having made use of wrought iron and steel 2000 years and cast iron 400 B. C. They built a bridge with cast-iron columns over a ravine 1000 feet deep in the first century of the Christian era.

GRATE SURFACE.—If the grate surface under a boiler is larger than is necessary to burn the required amount of coal, it is neither economy, convenience nor good judgment to retain the full surface, as better results, with less labor and more economy in fuel, would be obtained by shortening the grates to such an extent that from 8 inches to 12 inches of fire would be required at all times.

HOW TO SOFTEN CAST IRON.—To drill chilled shoes and plow points for riveting steel upon them, heat to a cherry red, keeping the work level in the fire; then with a pair of cold tongs, put on a piece of brimstone, a little less in size than the diameter of the hole which you wish to drill. This will soften the iron entirely through the casting. Let it lay on the fire until black, then lay away until cool, after which it can be easily drilled.

TESTING STEEL WIRE.—An ingenious method of testing the hardness of steel wire has been invented by a Swedish metallurgist. It is based upon the intensity of current necessary to fuse a wire of a standard size. By experiment, the current required to fuse standard wires of different degrees of hardness can be determined, and upon this basis, the quality of any sample can be ascertained.

CHEAPENING MACHINERY.—Pumping engines for city water works were a rare and costly luxury a few years ago. Now, owing to the reduced rates at which they can be afforded, they are within the reach of almost any small town.

SCIENTIFIC PROGRESS.

Telsa's Wonderful Electrical Experiments.

The scientists of two continents are just now largely interested in the wonderful series of experiments in which Mr. Nicola Telsa has been engaged for the past two years, which he first made known in an experimental lecture in New York about a year ago, and which has quite recently attracted still wider attention by his late lectures in London. These experiments relate mainly to the practical possibilities of electric induction, and alternating currents of great frequency and high potentials.

In these investigations, Mr. Telsa has opened up quite a new field of electrical research, and one which promises most important results, both theoretical and practical. While deeply interested in the former, from a scientific point of view, he is never unmindful of the latter, as involving principles of the highest service to mankind.

In our last issue we made some extended notice of the possibility of certain practical results, attainable from the more recent discoveries in connection with electrical induction. In the present issue, reference is made to the possibility, theoretical and practical, that may be derived from alternating currents.

THE MATTER OF RAPID ALTERNATION

Seems to have been much neglected by former students and experimenters, especially in regard to the phenomena observable in vacuum tubes. Great pains have been taken to secure high potentials, but very little attention has been paid to the rate of alternation or the rapidity with which the current vibrates to and fro. From Mr. Telsa's investigations, it appears that the latter is of great, if not of more, importance than the former. He has found that by increasing the rate of alternation to a very great extent above what has been heretofore attempted, most wonderful and quite unexpected phenomena are presented. Heretofore, the alternations have been confined to from 13,000 to 15,000 per second; but by a peculiarly-constructed dynamo, he has been enabled to raise the potential to quite a million volts.

One of the most important results developed by Mr. Telsa's experiments is the fact that alternate currents of extremely high frequency and potential are perfectly harmless in their effect on the human body. As a proof of this, Mr. Telsa receives a current of some 50,000 volts, without any inconvenience. This is in direct contradiction to the hitherto universally received theory that the higher the potential, the more deadly the effect.

An important conclusion, legitimately drawn from this phenomena, is that a close analogy exists between the physiological effects of heat and light vibrations and those of electricity—it depends upon the degree of velocity of these vibrations whether our senses perceive them as heat or light. Vibrations of lesser velocity are manifested as heat; those of a higher rate, as light.

May not this discovery help the scientist in elucidating some of the hitherto inexplicable phenomena connected with the theory of light?

The slower vibrations, or heat, are fatal to the human body, while the vibrations of greater velocity, light, are receptive and harmless. So the slower electric vibrations of say 2000 volts or more, will kill a man, while a current of 10 or 15 times that amount will not harm him providing the current (amperes) are reduced in the same ratio.

Mr. Telsa began his lecture before the Royal Institute by an experiment which consisted in taking in one hand a glass tube, exhausted of air and about four feet long. While holding this tube in one hand he connected the opposite hand with the terminal of a coil. The tube instantly became so luminous that when the gas was turned off it gave sufficient light for reading a newspaper. It was manifest that electro-magnetic radiations—not a direct current—were being conducted through his body to the tube, where those radiations put into active motion the few molecules of air left in the tube, which by their bombardment of each other, created the light observed, which was soft and much resembling mild sunlight.

Another effect of electric radiation was shown, as follows: Two zinc plates, one resting upon the floor and the other elevated ten feet above, each connected with the poles of a coil. An incandescent lamp bulb was placed midway between the two zinc plates, when instantly the exhausted lamp bulb be-

gan to glow brilliantly, without any connection with an electric current. The phenomena was similar to that of the tube, only the first was radiation passing from a coil through the body of the experimenter, while the other was radiation without any other conductor than the air itself, there being a distance of five feet from the bulb in either direction to a coil.

WHAT THESE EXPERIMENTS PORTEND.

He must be dull in the extreme who cannot discern from these experiments the possibility of important practical results, from the latter or radiation results, which may lead to a complete revolution in our present methods of illumination, whether by gas or electricity. If the rarified air in a tube or lamp bulb can be put into a luminous condition, why may we not hope to eventually render the air of a room equally sensitive to some condition of electric radiation? What other potentials may still lay hidden in this new and wonderful phenomena—who can tell?

Again, it requires no great stretch of the imagination to realize what immense importance may attach to that other phenomena of the varied rapidity of alternating currents which may be increased from 2000 or less in a second to a million or more. The wonderful modification which is thus effected in the action of the electric current on the human body is in the same line as were the Lauffen experiments in conducting electric energy, in a comparatively safe manner, between two widely distant points. It is a great comfort to know that we are becoming more and more experienced in the matter of more safely handling the electric current, and a great practical importance that we are constantly improving in our methods of transmitting its energy.

Telsa's experiments prove that we have more than one electrical "wizard" in America, and that the latest studies in electric radiation and induction give us great reason to believe that there are yet more and greater secrets to be uncovered and brought to the aid of man in his present wonderful researches into the great unknown.

A NEW FILAMENT FOR INCANDESCENT LAMPS.—Philip Hickley, of Evanston, Ill.; claims that incandescent lamp filaments possessing the desirable qualities of long life with the capability of high incandescence can be produced from the roots of certain plants belonging to the order of graminæ, and particularly of the species sativa, commonly known as "rice plant." This plant is a native of tropical countries, but has been introduced and cultivated extensively in higher latitudes, and a great many varieties are known. Mr. Hickley has experimented with the roots of a number of varieties of the rice plant, and among them he finds that the roots of that variety known as the "Italian" will produce excellent filaments. The root of this plant is of suitable size and length for filaments and requires but little shaping to prepare it for use. In its structure it is remarkably dense and free from pores. It possesses great toughness, combined with flexibility, permitting it to be readily shaped to the desired form without in the least injuring its texture. There is sufficient variation in the size of the roots to permit their being used for the various sizes of filaments.

PROGRESS IN CHEMICAL SCIENCE.—After several years of constant study and experiment, Prof. William Read, of Needham, Mass., has succeeded in producing a new chemical which is entirely akin to the various lines of alcohols now used for manufacturing purposes. This discovery, which is of a very startling nature, has placed upon the market a new alcohol which is superior to all others in solvent properties, especially in the manufacture of dyes, and which is much cheaper. The properties of the new spirit, and the results it produces are identical with those of the ordinary alcohols, except as above stated. A large corporation under the name of the Massachusetts Chemical Company, is erecting laboratories which are rapidly approaching completion, and which will be adequate to supply the demand for the new chemical.

THE MARVELS OF ASTRONOMY.—Look at the Pleiades with the unaided eye and you may see six or seven or a dozen stars; look at it through a three-inch telescope and you may perhaps see 300; study it through a telescope for three years, as M. Wolf has done, and map the stars and their places and you may record 600 to 700 stars on a strange background of nebulous light; expose a sensitive plate for an hour, and more than twice that number are revealed; lengthen the exposure to four hours and you have a picture of 2326 stars, with a different and more extensive background of nebulousity.

ELECTRICITY.

Electricity in Mines.

The following summing of what is now being done by electricity in mining questions is taken from a leading editorial in a late number of the *London Mining Journal*. It will no doubt be perused with much interest by our readers. We have taken the liberty to strike out a few paragraphs to bring it within the scope of these columns:

The problem of how to reduce the cost of working mines to a level at which other than exceptionally rich deposits may be profitably exploited, is unquestionably largely bound up with the progress of electrical engineering. It is, indeed, hardly too much to say that mining is destined in the future to become an appendage to the electrical industry, and the important position taken up in the present Exhibition at the Crystal Palace by appliances adapted to all the numerous purposes of mining and metallurgy is sufficient to show how much has already been done toward attaining this end. Mining engineers have, therefore, peculiar interest in the important advances which have of late been made in electrical science, advances which, in fact, place electricity upon a new basis in its practical application to the transmission of power.

The results obtained by the historical experiments in long distance transmission from Lauffen to Frankfurt suffice to show that the resources of electricity in this respect are practically illimitable, and the researches of M. Telsa and of other electricians afford substantial ground for believing that we shall before long witness an enormous reduction in the amount of power required to be expended in order to obtain sufficient electrical force to drive machines. The excessive strain upon machinery which was formerly necessary to produce powerful currents has already been so far lessened as to appreciably affect the cost of generating and transmitting electricity. This is but a typical example of the advances in electrical science that are bringing it nearer and nearer to general application in mining. The objection that was formerly entertained against the employment of electricity in mines through the danger of explosion in fiery workings, from the sparking of the commutators, can no longer be upheld, and another difficulty that arose from the depreciation of the delicate machinery by dust has been effectively overcome. In the best commutators there is no sparking whatever, and the simplicity which is being attained in the construction of electrical machinery has lessened considerably its liability to be affected by the dust. Indeed, there is reason to believe that, compared with steam, electricity already possess advantages besides that of cheapness, under circumstances that were formerly considered to present the greatest impediments to its employment. Where cheap motive power can be obtained for driving the dynamos, and where it is found necessary to convey the power over long distances, there is no question whatever that electricity is the best force available for mining purposes. The conveyance of power by bands and pulleys is wasteful and inefficient, and compressed air does not, in all respects, fulfill the purposes that were at one time claimed for it. A great loss is certainly experienced in the conveyance of electrical power over distances of any magnitude, but that loss is rarely so much as 50 per cent, and at this point electricity is considerably cheaper, besides being more convenient, than any other power.

ELECTRICAL TRANSMISSION OF POWER.

It is evident that where water power is available, electrical transmission must furnish a most valuable aid to the mineral development of a district. The Frankfurt experiment has conclusively demonstrated that its capabilities in this direction are of the very widest range, and it is quite impossible to say how largely they may assist in opening up metalliferous wealth, which could hardly be worked if it were necessary to carry fuel to the mines. Moreover, even where water power is not available—and there are comparatively few districts where a river or water course cannot be turned to some account—electricity is the most economical and efficient agent that can be employed for driving mining machinery. This seems to be a growing conviction among mining engineers, who are coming to regard electricity as an established factor in their operations. Electricity has no longer the limited scope which it formally possessed, but it is now applied to every process of mining, and extensive plants are being laid down not only in this country but in Amer-

ica and on the Continent. A striking instance of the way in which the electrical engineer has overcome mechanical difficulties is afforded by the successful pumping operations at St. John's Colliery, Normanston. This instance is quoted by the Earl of Albermarle, who says that the plant was required to cope with a salt water feeder of 5100 gallons an hour, at a vertical depth of 900 feet below the surface of the ground. The pressure on the ram faces was so much—400 lbs. to the square inch—that very specially designed pumps were required. These difficulties were successfully overcome, and the electrical plant laid down is now raising 125,000 gallons a day. The efficiency of this plant is about 50 per cent. Considerable difficulties, too, have had to be met with in the designing of locomotives for mines, since the excessive wear and tear to which they are subjected would seem to render electricity an imperfect agent. But, as in everything else in which electricity is the motive power, the progress of electrical science has overcome these obstacles. Upon the Continent, attention is being particularly given to this method of transport, and several types of locomotive have given satisfactory results. Among these, prominence must be given to one where the current is taken off a copper wire fixed to the roof of the gallery by means of a light metal frame which rubs along the wire. The return circuit is through the rails. Again an engine is being constructed by a French engineer, which, it is claimed, will transport 25 wagons, loaded with 8½ cwt. each, at a speed of five miles an hour over a line of two feet gauge. It is evident, however, that though electricity is destined to play a principal part in the working of collieries, it must depend for a great deal of its success upon metalliferous mining, where the question of motive power, and the extraction of metal from the ores is very often fraught with considerable difficulty. Under these circumstances it is encouraging to learn, upon the testimony of Mr. Edison, that the application of electricity to metalliferous mining will soon be attended with results of great economical value.

EDISON'S PROCESS OF SEPARATING MAGNETIC IRON ORES.

An electrical concentrating works for the separation of magnetic ores is about to be established by Mr. Edison at Ogden, New Jersey, and the circumstances, under which this experiment is to be carried out, give reasons for believing that it will afford unquestionable proof of the industrial applicability of electrical science to the treatment of low grade and refractory ores. The work to be done with the magnetic ironstone at Ogden consists in merely quarrying out the rock, transporting it to the crushers, thence to rolls and screens where it is pulverised and passed through a sieve of 50 meshes to the lineal inch, and afterward to the magnetic separators. The separated magnetite is then loaded into cars, and the waste taken to the dump. It would be difficult to find a mining enterprise in which the technical problem is more simple or the financial question more involved. Mr. Edison hopes to conclusively prove in dealing with it that ore can be more advantageously treated by electricity than by other means. He certainly will have an excellent opportunity of proving his claim, since the rock upon which he will commence operations contains only 16 per cent of magnetite. If the experiment realizes anything like a profit it will be impossible to gainsay the services which Mr. Edison will have rendered to the metalliferous mining industry. If there is anything like a solid foundation to the claims that are being put forward the prospects of electricity in the separation of ores seems peculiarly auspicious. It has been applied to prevent mercury from "sickening" in the treatment of refractory gold ores in South Africa with satisfactory success, and a machine for this purpose is one of the exhibits at the Crystal Palace. In other branches of metalliferous mining the advantages of electricity are being continually exemplified by new instances.

ELECTRICAL SMELTING AND DEPOSITION

has fairly won a position for itself, and the latest reports upon the Elwell process show that the technical difficulties attending this utilisation of electricity have been surmounted. Hitherto, the industrial application of electricity has only been in its experimental stage, and as regards mining this application is as yet largely a matter of theory. But taking into account the achievements of electrical science in the past, and estimating from these its possibilities in the future, there is ample ground for anticipating an improvement in the processes of metalliferous mining that will enable proprietors of mineral properties to take fuller advantage of the resources at their disposal.

ENGINEERING NOTES.

The Nicaragua Canal.

The entire country is becoming more and more awake to the great importance of the Nicaragua Canal, and to the fact that it is absolutely necessary to our commercial progress that it should become essentially a Government work. It would be most suicidal to allow any other country to secure a pecuniary control over it, and scarcely less so to allow its control to pass into the hands of the money kings of even our own country.

The canal, instead of being a competitor with our overland railroads, would, if rightly managed and in the interest of the people, be beneficial to them in building up the country and creating a vast business for them, which it could not itself conduct—and indeed, which it would not need.

Recent experience has shown that waterways, instead of being competitors to railroads, are a benefit to them. Warner Miller, the President of the Nicaragua Canal Company, in a recent address, while speaking of the benefits to arise from the canal, said its construction might easily double the output of the Pacific Coast States in agricultural productions and find a ready and profitable market for them in Europe, because the cost of transportation would be reduced by the reduction in distance. Furthermore, it had been estimated that the increased value of the timber now standing around Puget Sound would pay for the construction of the canal. The great forests in the central part of the country are becoming rapidly depleted and new timber fields are best found on the Pacific Coast. It goes without saying that the building of the canal will rapidly increase the population of all the Pacific States. Their soil and climate are the best in the world, and the Coast is capable of supporting a population of 100,000,000 if all the lands are taken up and cultivated.

Senator Dolph gives three excellent reasons why the Government should extend financial aid to the Nicaragua Canal Company. First, because he desired to have the canal speedily constructed; second, because he desired that when constructed it should be under the control of the United States, and third, because he desired the canal to be capitalized only at its actual cost.

In the event of war between naval powers, the control of the canal would be so decided an advantage that no one can predict what might happen. But if the United States furnishes the money to build it, there will be no question as to the right of the American Government to control it. The \$100,000,000 the canal will cost is hardly a matter for consideration in view of the importance attached to the possession of the canal.

The simple and easy way to construct the canal is for the United States Government to endorse the canal company's bonds under conditions similar to those provided in the bill introduced into the last Congress, which placed, at least, the temporary management of the canal, especially the rates of toll to be collected, in the hands of the General Government. That bill furthermore gives to the Government the power to purchase and hold perpetually in its own right a majority of the stock of said company, in the proportion of 70 to 100 shares, if it shall decide it may be for the public interest that such purchase be made.

Under that bill the nation will thus acquire the right of control whenever it sees fit to assert its right. We do not want foreign capitalists to build it, nor transcontinental railroad men. The canal should be maintained as a competing route between the two American coasts, with tolls as light as the nature of the service will permit. The Nicaragua Canal is practically the only competitor to a transcontinental railroad. The Canadian road is always for sale to the highest bidder and consequently no competitor at all. The key to the value of the Nicaragua Canal as a competing route lies in the power to fix the rate of toll. The canal will always be open to vessels of all nations, but an excessive rate of toll would impair its usefulness as a competing route.

SIDE-WHEEL STEAMERS DISAPPEARING.

It is probable that the magnificent side-wheel passenger vessels plying on the Long Island Sound will be succeeded by screw boats. One of the lines is having two propellers built, and if they prove successful it is believed that no more side-wheelers will be erected for this service.

THE FIRST SUSPENSION BRIDGE in England was erected in 1741 across the Tees at Middleton. It was 70 feet span, and was erected for the use of miners. It consisted of two common chains stretched across the river and fixed into the rock at each side.

GOOD HEALTH.

Try.

A correspondent of the *Farm and Fireside* who has had considerable experience in such matters, suggests the following:

For sore throat, inflamed tonsils, quincy and even diphtheria, try a gargle made of equal parts of soda and pulverized alum, with a little carbolic acid. Put in a large bottle and add water.

If an insect crawls into the ear, close the other with a finger, shut the mouth and pinch the nose. The insect will crawl rapidly out.

If the child pushes a bean, kernel of corn or other obstruction into its nose, rub the nostril with Scotch or other snuff to provoke sneezing.

If anything gets into the little one's eye, a mother would not refuse to wipe it out with her tongue when she has learned that it would cause an irritation to do so.

For catarrh I use one-third pulverized burnt alum and two-thirds refined borax. Mix well and snuff up the nose a very small pinch of it both night and morning. If the throat is inflamed I take a pinch of the mixture and let it dissolve in my mouth. For a cold in the head the above snuff is excellent when snuffed up the nose.

MENTAL DISSIPATION.—"I know a literary man," says a philosophic friend, "who works from 12 to 13 hours a day. He complains—when he has time—that he hasn't half time enough to do what he would like to do. That man is a study. He is the best read man I know—is a living encyclopedia of knowledge. But he doesn't know enough to come to dinner. I presume such men are necessary to the world. It is a curious thing that the man who works hard with his brain conceives more work and is inspired by the ambition to accomplish it; whereas the man who hasn't anything particular to do never originates anything and finds it a task to do anything. These qualities often exist in the same man. Now, in my own case, when I am much driven, I think of lots of things I'd like to do if I had time. I make a memorandum of them and put them aside, working a little on this or that between times. Just as soon as I am relieved from mental pressure my thought capacity, industry and ambition collapse together. I think work, congenial mental labor, is a sort of dissipation. The more you have of it the more you want and the more you can do—until something snaps."

DANGER IN WEARING RUBBERS.—A chiropodist says: Since the streets became so muddy I have had a number of sufferers apply to me for relief. If a man has a corn I can take it out and relieve him, but if he is suffering from what I call "rubber fever" I can't help him and can only prescribe liberal foot bathing and a removal of the cause of the trouble. Rubbers should only be worn to keep the wet out, and they should be removed the moment the wearer gets indoors. Failure to note this gives a man wet feet in a far worse sense than if he had waded through mud ankle deep. It was the trouble resulting from forcing the perspiration to soak the stockings and keep the feet perpetually damp that drove rubber-soled boots out of the market. Even loose rubbers are a source of danger and the cause of many more serious colds than they avert. —St. Louis Globe-Democrat.

CYPRESS OIL FOR WHOOPING COUGH.

A correspondent of the *St. Louis Medical Journal* recommends cypress oil, distilled from the needles of the cypress tree (*cupressus sempervirens*), for whooping cough. Drop a little oil on the collar or pillow of the child at night, so that the fumes may be gently inhaled. The writer sums up his experience as follows: Cypress oil is the most promptly successful remedy for whooping cough; it is perfectly free from the disadvantages of many of the other known remedies, such as Belladonna, various balsams, etc. It is very easy of application, and has a strong, but not disagreeable, odor, to which the children do not object, and which after a short time they even enjoy.

A MEDICAL DISCOVERY, considered of no inconsiderable importance, was recently communicated to the Paris Academy of Medicine by Dr. Leon Danion, on the introduction of various medicines into the system of animals and men by means of electricity, which he has demonstrated by various experiments on himself. It is through the mucous membrane that Dr. Danion claims to introduce the substance by a method which, if borne out by experience, will revolutionize the healing art.

MINING AND SCIENTIFIC PRESS

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SAN FRANCISCO:

SATURDAY, MARCH 12, 1892.

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Passing Events.

Senator Felton has introduced his mining debris bill by which the Government is to collect a tax of three per cent on the gross output of the mines benefited by the restriction works to be put up by the Government. A smaller appropriation than was at first thought necessary will be asked for since all that is now wanted is an amount which can be profitably expended during the fiscal year ending June 30, 1893.

Several important mines in Montana and Colorado have shut down owing to the low price of silver. The prospects of favorable legislation on the silver question are better than they were a few weeks since.

The change in the directory of the Hale and Norcross mine is a distinct victory for reform in Comstock mine management. All the old directors and officers were displaced, and the mine is to be worked on a basis where the stockholders will have something to show for their money. The Hale and Norcross suit has shown up in a marked manner the bad practices which have prevailed, and it looks as if directors would have to be more careful in the future, especially if any officers of the Mining Stock Association are stockholders.

FOR the last month, \$18,000 in wages were paid out in Bodie, and nearly the same amount will be paid out this month. About 150 men are at work, and the town is livelier than it has been for five years.

A Reform Commenced.

The annual election of the Hale and Norcross Mining Company, which took place on Wednesday, was an interesting event in mining stock circles, in view of the recent litigation by which the practices of the mill ring were shown up. At the election the control of the mine passed into the hands of Mr. Flood. The following Board of Directors was nominated and elected: N. T. Messer, George R. Wells, W. S. Lyle, Charles H. Fish, W. H. Hart, W. Edward and A. G. Gurnett.

After the meeting the directors met and elected N. T. Messer President of the Hale and Norcross Mining Company, vice H. M. Levy, and Joseph Ryan superintendent of the mine, vice R. B. Keating. Both these officials occupy the same offices in the Andes Mining Company. This lets out every one of the old directors of the company, including President Levy, who still remains in Nevada, out of the way of legal process in this State.

The feature of the meeting was the protest of J. H. Tingman of the Mining Stock Association and a stockholder in the company. He read a communication in which he referred to the recent suit, where it had been shown that the milling company had paid percentages to officers of the Hale and Norcross Co., and had withheld a certain amount out of the ores worked. He protested against the delivery of any more Hale and Norcross ore to these millmen, and against the company paying out money to defend those who had looted the mine, and against levying assessments to provide funds for any such purpose.

Mr. Tingman said that the Mining Stock Association demands, first, that all the Hale & Norcross ores shall be reduced in mills leased or owned by the company, and that the directors thereof shall deliver no more ore to the nefarious mill ring to be looted; second, that full car sample and battery assays of all ores taken from the mine shall be furnished to the stockholders under oath as the law requires; third, that the board of directors to be elected to-day shall take immediate steps to recover the sums of money fraudulently paid to attorneys and witnesses I have mentioned.

Dr. W. N. Griswell moved that the protest should be spread upon the minutes, which was adopted. W. T. Baggett desired to have it stated in the minutes that the motion was carried without a dissenting voice, which was ordered.

There is really more in this than appears on the surface. Notwithstanding that Mr. Flood has taken charge of the mine, the stockholders have unanimously instructed the Directors to carry out the radical changes included in the above demands, and they will have to do it or get into trouble.

The Directors are really only the representatives of the stockholders, and must do as instructed by them. Generally the Directors have done about as they pleased, without any thought as to the stockholders, and this looks like the first move in a reform which will go much further.

These officers and directors have usually been looked up to with fear by "the street," as they have had their way for a long time. This move, however, has given more strength to "outsiders" than anything which has happened in ten years. While the brokers have only two representatives in the directory, they form a working minority. Already, it is stated, at their instance and by their motion, the superintendent's salary has been cut down to \$250 per month, and the \$250 a month assistant superintendent will be removed. They have sent for a complete list of employees and their duties for the purpose of cutting off useless men.

Attorney-General Hart is one of the directors, which is almost a guarantee that the reforms demanded will be carried out,

and the laws be enforced. Those who have been pillaging the mine and the stockholders, will be brought to punishment.

By forcing the Hale & Norcross into this position, it will result in bringing other companies into line. The indications are that it is the dawn of a new era for the Comstock. It places ordinary stockholders in a better position than ever before, and if this can only be followed in other companies, great benefit to legitimate mining will result.

Cable Cars on Grades.

The recent accident on the California-street cable line in this city has called attention to the subject of methods of controlling cable cars on steep grades, and the usual number of suggestions have been offered by people with no practical knowledge of the mechanical details of such cars or roads. Every time anything of this kind happens a number of inventors come to the front with plans or systems intended to obviate the difficulty. Safety devices are specially attractive, but in eight cases out of ten the plans offered have already been considered by the companies, who already own many patents which have not been applied, as well as many in use.

When the heavily loaded car rushed down the steep grade of the California-street hill, it was a very dangerous ride for the passengers. The car came over Powell street at half speed, and just as it got over the crest, the grip, in being tightened up on the cable, broke off short at the head. The gripman lost his balance, and before the brakes could be fully set, the car acquired great momentum, and its speed was not checked until it got half a block below Kearny street, where there is still quite a grade.

In addition to the ordinary wheel brakes, there are on these cable cars two sets of track brakes, one for the gripman to handle and the other for the conductor. The track brakes are wooden shoes which the levers throw down firmly on the flat top of the street rail or track, and are very effective. On this particular morning, however, the track was "greasy" from the fine drizzling rain which was falling. So the locked wheels and track brakes did not stop the car, which slid down the steep incline, at one time going about 30 miles an hour. With the track brakes there are four shoes, two on each side. Had these brakes been applied before the car acquired great momentum, it could easily have been stopped on the steep grade, notwithstanding the broken grip. As it was, no one was hurt in the wild ride, as all the passengers remained on the car, no one jumping off.

The great danger in such a situation is collision with teams at the street crossings, in which case, of course, the car is suddenly stopped and a smash-up results.

And this brings us to the point of importance in connection with these cars on the steep grades. An appliance has been invented called the slot brake, which is simply a wedge that can be forced down into the grip slot to suddenly stop the car in an emergency. Many people argue that had this slot brake been on the car, it could not have gone down the hill as it did.

It is very much of a question whether such an appliance would not have increased the danger to life and limb rather than lessened it. It is the sudden stop which throws people from the car or injures them. When the cars bring up on the safety bumpers at cable crossings, some one is nearly always hurt, and then they are running only at ordinary speed. Experience proves that the wheel and track brakes are very effective when promptly applied. The men are ordered to be at their brakes on the hill, but the conductor is not always at his post by any means, although supposed to be. In case of accident to the gripman, as in this instance, prompt application of the track brake by the conductor would

have prevented the runaway. But neither set of track brakes were applied until momentum had been acquired. The gripman should also "tighten up" before he comes over the crest of the hill, because on the start down there is an extra strain coming suddenly on the grip anyhow, and this should not be increased at that point.

If the brakes had been promptly set on the car of which we are speaking, there would have been no need for a slot brake; and if, after the car got started, a slot brake had been applied and the car suddenly stopped, the passengers would doubtless have been thrown off and injured.

If it were possible under circumstances of such excitement to apply a slot-brake gradually, it ought to act very well; but it would be more apt to be applied suddenly, and the effect would then be as bad as a collision.

At Kansas City, where the cable cars run for some 800 feet on a ledge with an incline as steep as the California-street hill, they put "crabs" on the cars to lessen the danger of a runaway. The crab was an appliance which grasped the sides of the rail and could stop the car instantly. They were put on all the cars, but one test was enough to show that they were dangerous, on account of the sudden stop. They were all thrown into the scrap heap.

In the St. Paul accident on Selby avenue, when a car ran away, it turned once at a curve, killing one man and injuring others. On our San Francisco hills there are no curves in the tracks and the car can be stopped in time as the grade lessens, provided the usual brakes are properly set.

Sand-boxes are to be placed on the cars, so as to give the track brakes a good hold. But on slippery days these hill tracks should be sanded by a track-walker, and not depend on boxes on the cars. Then there would be little danger of the car running away.

There have been very few accidents on our steep hills, but a few runaways would destroy confidence in the cable cars on the grades. The companies should therefore be very strict with their employees. Under no circumstances should the conductor leave the platform to collect fares or do anything else when on the hill; and the sudden "cinching up" on the start down the grade should be stopped at once and the men shown where to tighten their grip.

The Hydraulic Mining Bills.

The Miners' Association delegates, Messrs. Searles, Hobson, Luttrell and McMurray, on Wednesday, appeared before a subcommittee of the House Committee on Mines and Mining and made extended arguments in favor of the debris bill recently introduced, and the subcommittee will at once prepare a report which will no doubt be favorable.

It is confidently believed that the whole committee will make a favorable report to the House with the appropriation considerably reduced. The figures were introduced in the bill to show the cost of a complete system of works, but it is not expected that Congress will grant more than can be profitably expended this year.

Three bills relating to mining debris are now before Congress—the Geary, Caminetti and Felton bills. It appears probable therefore that some action will be taken this session. If even a start is made, it may be taken as cause for congratulation on the part of the miners. If they know that something is to be done toward the dams, it will show that in the end the mines will again be permitted to be worked. The delegates at Washington are encouraged to believe that everything now looks favorable.

THE Kennedy mine, located near Jackson, Amador county, commenced to pay dividends something over a year ago, and since then has paid twenty-three, aggregating \$372,000, the last being one of 50 cents a share, paid January 7, 1892.

Automatically Dumping Mine Cars.

In describing the iron breaker at Drifton, before the American Institute of Mining Engineers, Mr. Eckley B. Ooze also describes some of the machinery for handling coal at the Cross Creek Collieries, Pa. Part of the coal prepared in the breaker comes from a mine about half a mile away. The loaded mine cars are brought by a small locomotive to the foot of the breaker plane, from which they are hoisted to the top of the breaker and dumped. The method of doing this is ingenious. The hoisting rope is attached permanently to the "harney," which is the local name given to the small car that pushes up the larger one. This "harney" is shown in the accompanying cuts. The gauge of the mine car is four feet and that of the harney three feet six inches.

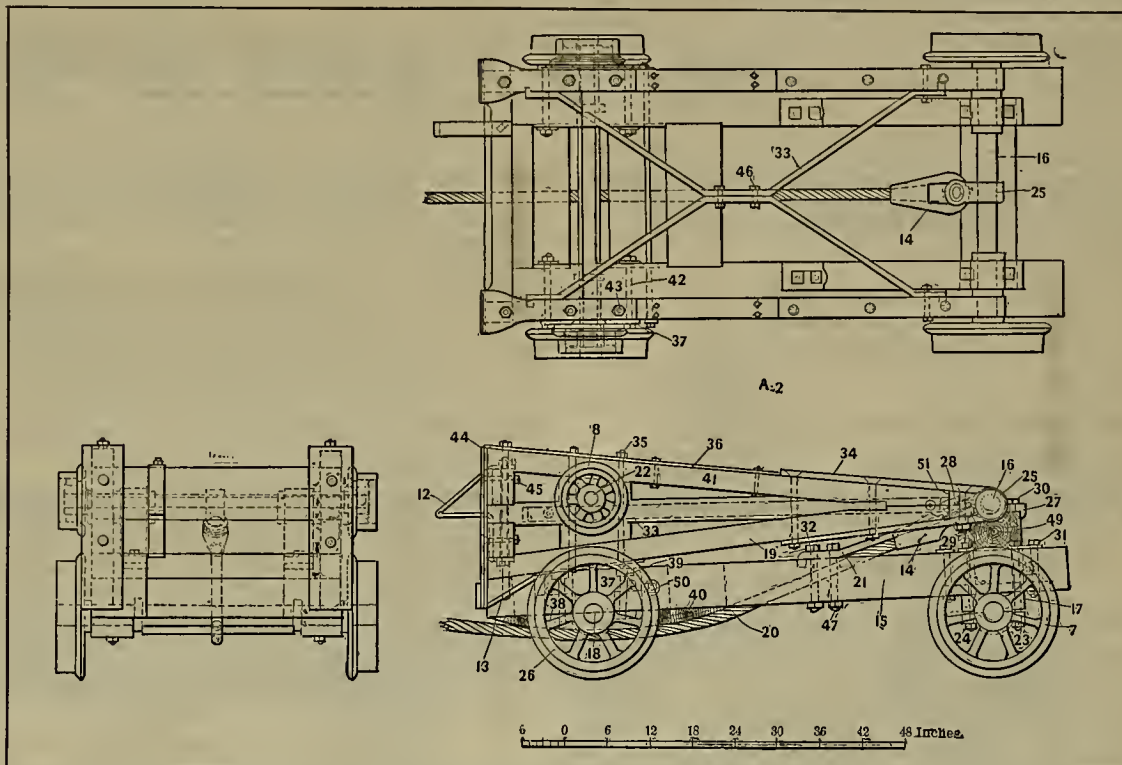
The upper part, or pusher, of the harney is hinged to the hack end, and at the front end carries two small wheels which, as the harney descends, lift the latches which are hinged at their upper end and fall freely, so that when the engine is reversed and the harney is hoisted, these latches catch the wheels and force the pusher open.

The mine car when it reaches the top follows a rail until the front wheel reaches a point (6) where the rail turns off. The hind wheel having reached a point just in front of that occupied by the front harney-wheel in the figure, and the harney being on the track where it is steepest, the line of thrust of the pusher is no longer on the line of the axis of the humper, but in an

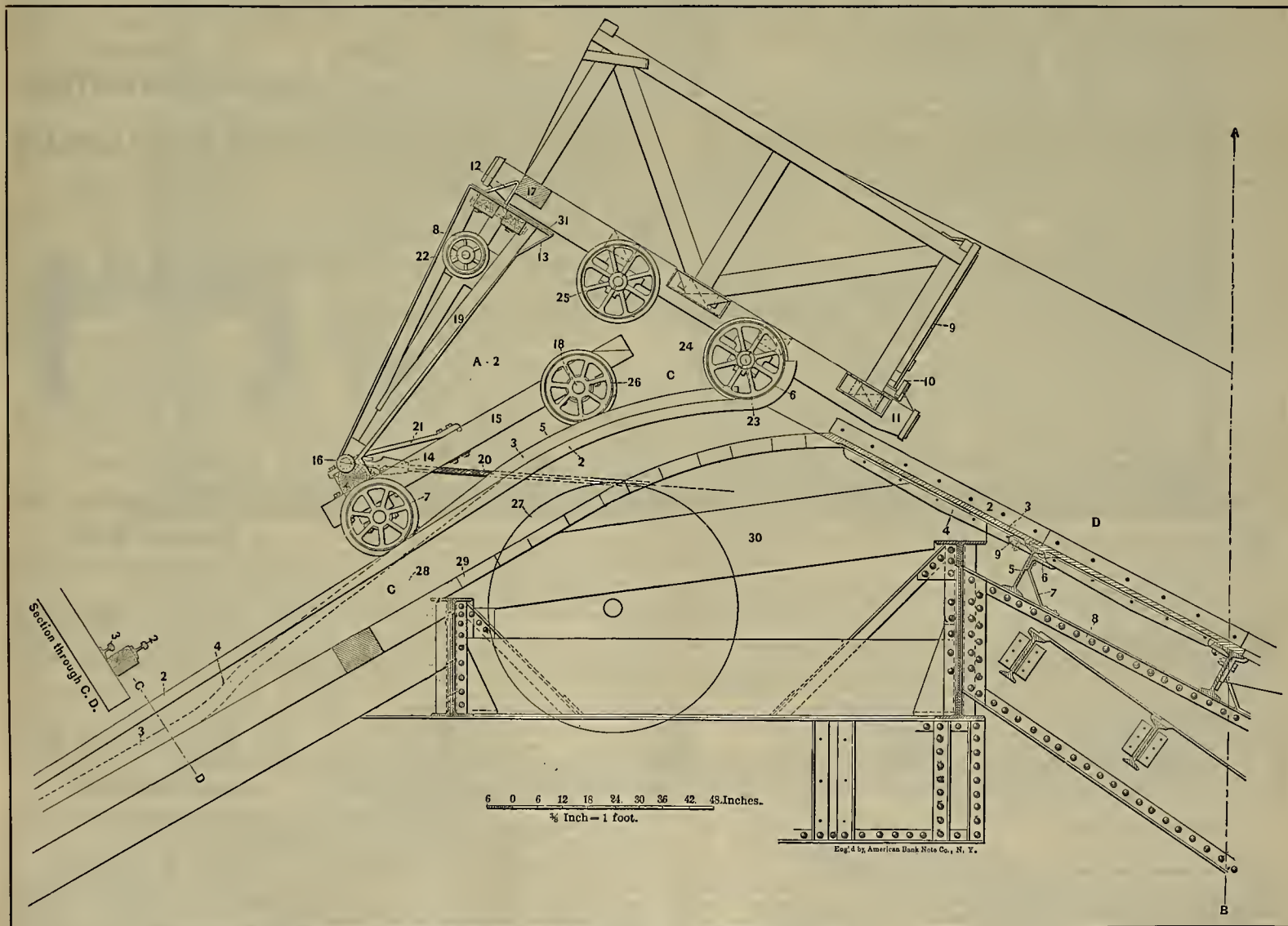
automatically releases the door of the car, and the car empties. In this system of hoisting, the rope is never attached and detached.

tal; 18, front truck-wheel axle; 19, lower sill of pusher-frame; 20, wire hoisting-rope; 21, pusher-shaft brace; 22, pusher-wheel axle; 23, cap for hack truck-wheel pedes-

wheel pedestal; 32, tie bolts for pusher-shaft strap; 33, braces in pusher-frame; 34, pusher-shaft strap; 35, binding bolts for pusher-frame; 36, thin binding for pusher-



"BARNEY" AND PUSHER FOR DUMPING MINE CARS.



METHOD OF AUTOMATICALLY DUMPING MINE CARS.

upward direction. Hence, as soon as the front wheel of the car is stopped at 6, the harney continuing to move raises the hack end of the car until it assumes the position shown in the figure, the body of the car turning on the front axle. The latch

The following are the numbered parts, showing details of the harney: 7, back wheel; 8, pusher-wheel for raising pusher; 12, check-horn; 13, riding-horn; 14, wire-rope socket; 15, main truck-frame; 16, pusher-shaft; 17, hack truck-wheel pedes-

tal; 24, cap-bolts for hack truck-wheel pedestal; 25, rope-clevis; 26, front truck-wheel; 27, hook on end of pusher-shaft brace; 28, pin for rope-clevis; 29, colter for rope-clevis pin; 30, top bolts for pusher-shaft brace; 31, base bolts for hack truck-

frame; 37, front truck-wheel pedestal; 38, cap for front truck-wheel pedestal; 39, bolts for front truck-wheel pedestal; 40, guard for rope; 41, upper sill of pusher-frame; 42, base bolts for front truck-wheel pedestal; 43, vertical bolts for front truck-wheel

pedestal; 44, bumper-plate for pusher; 45, bolts for bumper-plate on pusher; 46, bolts for braces in pusher-frame; 47, bottom brace-bolts for pusher-shaft; 49, large timber under pusher-shaft; 50, binding-bolts for front part of truck-frame; 51, cast iron bearing-block for pusher-shaft.

For details of the Barney dump, the numbered parts are as follows: 2, mine-car rail; 3, Barney rail; 4, abrupt change in grade of Barney rail; 5, second change in grade of Barney rail; 6, check horn on end of mine-car rail (2); 27, five-foot sheave wheel; 28, heavy timber under rails; 29, floor on top of plane; 30, beam over wrought-iron girders.

On mine car X: 9, tail gate; 10, gate latch; 11, bumper; 17, cross beam on back of car; 23, front car-wheel axle; 24, front car wheel.

On dump chute: 2, sides on chute bottom; 3, cast-iron chute plates; 4, web on chute plates; 5, I-beam supporting chute plates; 6, angle-iron stiffener on I-beam; 7, brace for I-beam; 8, top flange of dump girders; 9, fish plate on upper side of I-beam.

World's Fair Commission.

The California World's Fair Commission met Tuesday and discussed various matters of importance. Commissioner Irving M. Scott presided.

F. J. V. Skiff, Chief of the Department of Mines and Mining, stated in a communication that he had mailed to the Commission 150 copies of a pamphlet containing the special classifications and rules of the Department of Mines and Mining. He asked that copies be sent to the leading mining corporations, metallurgical establishments, geologists, mineralogists, mining engineers and assayers throughout the State. Favorable action was taken.

A communication was received from J. M. Samuels, Chief of the Department of Horticulture, submitting a list of plants, including 500 orange trees in fruit, needed in the great department buildings. He suggested that steps should be taken at once to secure the plants and trees, and the Secretary was instructed to communicate with nurserymen throughout the State asking them how and when they will furnish the plants desired by Mr. Samuels.

State Mineralogist Wm. Ireland addressed the Commission relative to a mining exhibit at the Fair. He said that a fine exhibit would do more to advertise the mineral resources of this State than any number of pamphlets upon the subject could hope to accomplish. The exhibit would be largely furnished by the Mining Bureau, provided the Commission would bear the expense of shipment, placing in position, etc. No action on the proposition was taken.

State Fish Commissioner J. D. Redding advocated the appropriation of \$15,000 to cover the expense of a piscicultural exhibit. He said that it was as necessary to show the world what can be produced in California waters as on its fertile soil. He did not believe that the amount asked for was extravagant.

At the suggestion of Chairman Scott, it was decided to entertain any suggestions made by Mr. Redding or any person actively engaged in pisciculture and consider them in detail at a subsequent meeting.

Willard Johnson of the United States Geological Survey suggested the need of making a relief map of California on a scale of two inches to the mile. This map, he said, should be constructed in five large sections, showing the mountains, valleys, forests, rivers, etc., of the various portions of the State. He thought the map could be constructed for about \$2500, and said that the price would prove insignificant when its value from a scientific and educational standpoint was considered.

Complimentary Samples.

Persons receiving this paper marked, are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

A RICH strike of gold has been made in the Humboldt district, Arizona, and miners are flocking there by hundreds. The ore is free milling and runs into the hundreds per ton.

The California Miners' Association.

Officers, Committees and Constitution and By-Laws of the State Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized.

The officers of the Association are as follows:

HON. J. H. NEFF.....President.
W. C. RALSTON.....Secretary.
THOS. B. EVERETT.....Asst. Secretary.
H. PICHOR.....Treasurer.

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Hon. J. K. Luttrell, of Sonoma County.	
Robert McMurray, of Nevada County.	
J. B. Hobson, of Placer County.	

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

SEC. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of this organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of eleven members selected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

SEC. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

SEC. 3. The President and Secretary of the Association shall be *ex officio* President and Secretary of the Executive Committee.

SEC. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of the Association.

SEC. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein prescribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

SEC. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall render annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

SEC. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by the President and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of the Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at the city and county of San Francisco.

SEC. 2. It shall be the duty of the Vice-Presidents of this Association to at once proceed to the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

SEC. 3. All persons friendly to the mining interests are eligible to become members of this Association. In the event that there is no County Organization, such person may unite with the State Association by forwarding his name to the Secretary thereof, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

SEC. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected as such County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by the Executive Committee, Jan. 22, 1892.

BY LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittees as they may determine. They shall fill all vacancies of the officers of the Association or members of any committee. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

SEC. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of the annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

SEC. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

SEC. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

SEC. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

SEC. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of each intended meeting.

SEC. VII.—The Secretary and Treasurer shall receive such compensation for their services as the Executive Committee may, from time to time, determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22, 1892.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F., Stock Exchange Building.

Assessment Notices.

KEYSTONE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Amador City, Amador Co., Cal. Notice is hereby given that at a meeting of the Board of Directors, held on Wednesday, the 9th day of March, 1892, an assessment (No. 2) of Two Dollars and Fifty Cents (\$2.50) per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 310 Pine St., room 43, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 19th day of April, 1892, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 9th day of May, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.

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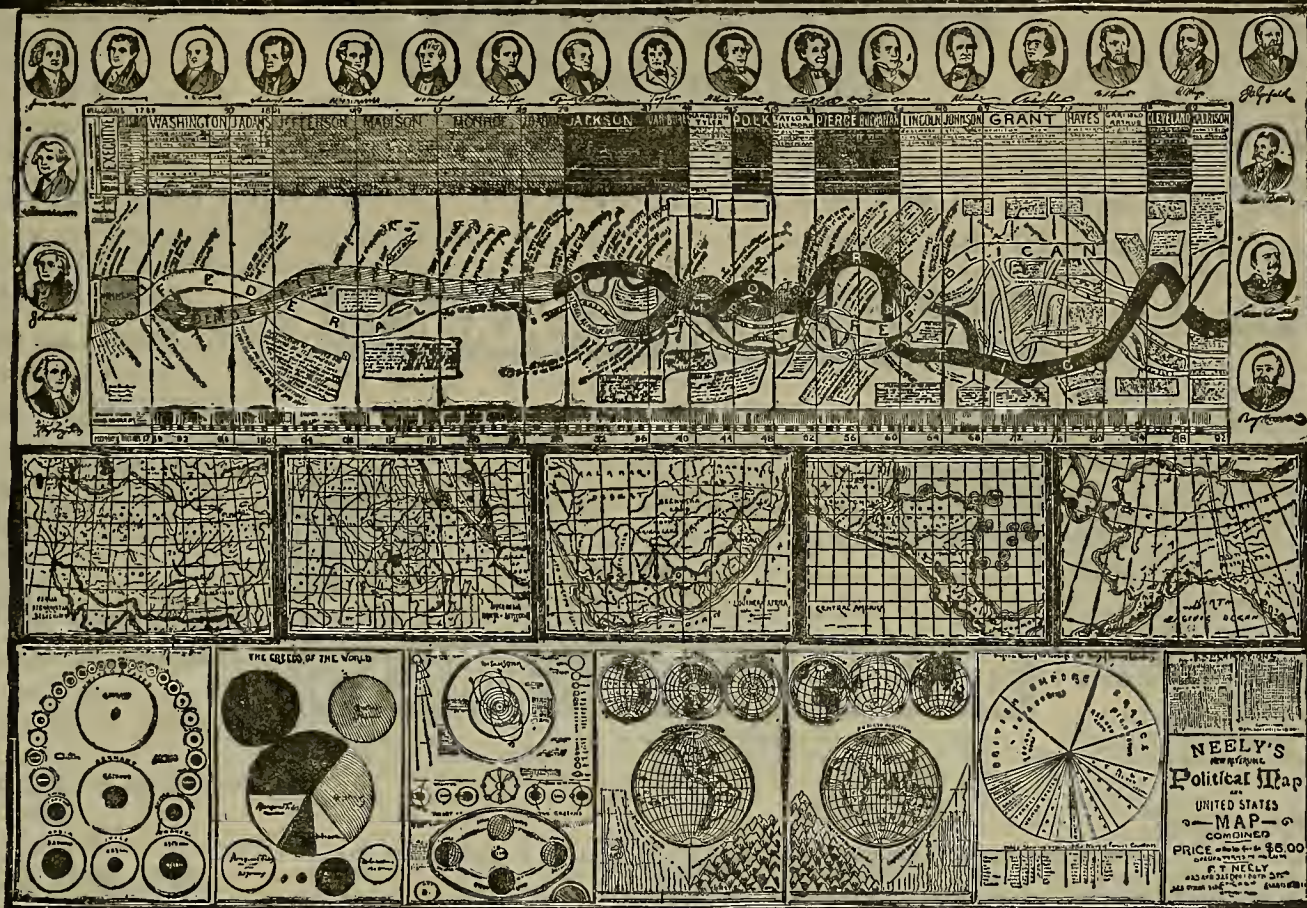
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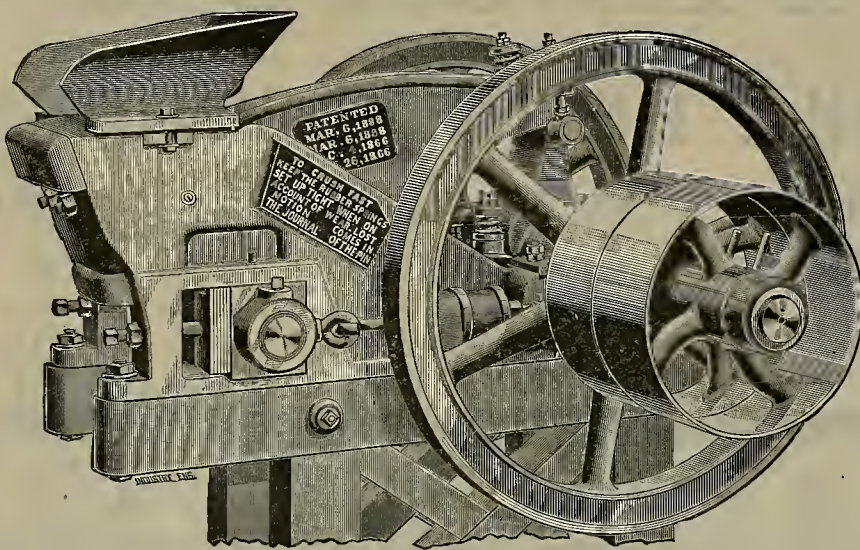
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For a NOTARY PUBLIC go to Lee D. Craig, No. 316
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Arizona Mines.

MINERAL PARK, ARIZ., Feb. 18, 1892.

TO THE EDITOR:—In 1875 a prospector who was out in the hills looking after his horse with the view of leaving the camp—there was nothing here—stumbled his toe against a boulder of horn-silver ore assaying over \$1,800 a ton. He “monkeyed” around there—called it mining, of course—about six months, and he took out over \$80,000. He located the mine and called it the “Metallic Accident.” That money was taken out of a hole—some one might call it a shaft—which is not over sixty feet deep. When the rich ore gave out he took a trip to the Centennial, and in less than a year he came back without a dollar and in debt. He never put one dollar in the mine to develop it. When he came back he sold it to three men for \$800, one of whom was a miner and the other two were not. They went down the hill and run a tunnel about fifty feet with nothing but hard rock in sight. They became dissatisfied and finally sold the property to an old farmer of Tehama county, Cal. He sends a man down here as a superintendent, who advises to run a tunnel ahead to strike the vein. He run about 100 feet, cut a six foot vein of low grade ore, right where the ore ought to be. But no; that wasn't the vein, so he kept on and run 160 feet farther in hard country rock without striking anything. A little circumstance happened then, which it is not necessary to relate here, and in consequence work was stopped, and with the exception of a few chloridizers who had worked the ground on the surface, sorting dumps, etc., nothing has been done with it since and it looks as if there never will. Of course it is a patented property and the owner don't even have to expend \$50 worth of work annually on it. Without a doubt, had one-eighth of the money that was taken out been expended on that vein it would have been one of the best silver mines on the Pacific Coast. But there it lies idle, another monument of bad management.

A few years afterward a prospector named Mike Dunn was coming down from Sherman's Peak where he had been prospecting, and in walking along, he either jumped a rattlesnake or the snake jumped him. However, he picked up a rock, threw at the snake and missed it. The rock broke and the snake got away. The rock looked like mineral and he brought it to town. He showed it to the same man that found the Metallic Accident, who sent it to Kingman and had it assayed. The result was 17 oz. gold and 1240 oz. silver. So they located it and called it the Rural. If there was one old timer who prospected the same ground, there were over 500 and at least over 1000 have walked over it, some every day for years.

They shipped considerable of the ore to San Francisco. A Colorado gentleman came along and gave Dunn \$10,000 for his interest. He then offered the other party \$25,000 for his; but no, his head swelled, and he wouldn't sell short of \$50,000, and it is a question if he would have taken that were it offered to him; consequently the ground lies idle and the holes in the ground are filled with water.

Just such things as that have retarded the progress of this camp. There was a piece of property that a miner wouldn't give \$500 for; a capitalist gives \$10,000 for a half interest, and after awhile he offers \$25,000 for the other half—not that it is worth it, but simply so that the property would belong to his company and he could put up mining machinery necessary for the development of the same. He also would have developed other property. But no, he couldn't get it; so he concluded to go home, as he had plenty of business to attend to there, and let the thing rest; and consequently we have a very dull camp.

We are, unfortunately, cursed with another lot of individuals who come here that never saw a mine or a piece of ore until they did come. They are here a little while and they know more about the mine on the different locations than the miners who work them, especially if strangers are around; and if things haven't gone just to suit them, they don't the camp and everything in it. They are going to leave it, etc., and the same no-account scrubs have been here for years, and you cannot drive them away.

If they should happen to strike a body of ore somewhere on the surface and get a few hundred dollars out of it, they have to go off somewhere on a splurge; but the same individuals will try to get back if they have to ride a brake beam; it's a pity the beam wouldn't break! As a general thing we have the most remarkably intelligent lot of experts (?) come here to examine mines that ever graced the business. They will come here representing themselves as millionaires or with a company back of them, and

they will hold a chair down at the saloon with their feet at an angle of 45 degrees on the porch post, and look at a hill a mile away, and tell you what is in it. Sometimes their company is foolish enough to put up money on their judgment, but in nine cases out of ten they are sure to lose, and their only excuse is to curse Arizona.

There has been, I know, considerable money put up for parties to come here and operate, to work and develop some properties here. The gentlemen who put up the money never come here to look even at what they were putting up money for, and are now cursing Arizona. I can say to you gentlemen that it is not the fault of Arizona. Before you put up any money or find any fault, come here and ascertain where your money has gone and see how much work you have had done for the money you have put up. There is but very little outside capital spent in this camp, and most of what there is has not been spent judiciously. The country has been self-supporting for the last 20 years, and that is saying a great deal for a silver mining camp. Where will you find another; especially when we are shipping most of our wealth out of the country? If you have made a failure and lost your money, put the blame where it rightfully belongs—with your representatives, if you please.

JAS. W. HAAS.

Impounding Debris.

Associated Press dispatches dated March 8th are as follows:

Senator Felton to-day introduced his mining debris bill. As expected, it contains a clause for an annual assessment of 3 per cent on the gross output of the hydraulic mines benefited, a definition of what constitutes material damage to a navigable river, and in a general way is simpler than Caminetti's bill in the House.

Secretary Elkins responded to Caminetti's joint resolution asking for estimates on the amount of money that can be profitably expended this year in constructing dams and restriction works to restrain mining debris. He furnishes estimates as follows, submitted by General Casey: Dam at De Guerre point Yuba river, \$150,000; restraining work below the dam, \$100,000; dam at Van Geisen's, Bear river, \$75,000.

Appended is a report from H. H. Benyard of the Corps of Engineers, dated at San Francisco, March 1st. Mr. Benyard says: “The board of engineer officers appointed to consider the hydraulic mining question in the State of California have reported the existence of vast deposits of material in various canyons of the rivers throughout the entire hydraulic mining region and in the plain below the debouch of the Yuba river from the foothills. A portion of this material will be carried down with each successive flood and will eventually find lodgment in the navigable portion of the river below, to the injury of navigation. The board proposed the erection of dams at the lowest point in the canyons of the Yuba and Bear rivers, and also the building of restriction works only on the Yuba between De Guerre point and its mouth.

“It was considered that these points (so long as hydraulic mining was not in operation) presented more favorable features for impounding works in the interests of navigation than could be found at other points above. In fact, to attempt to restrain the entire amount of debris, where now situated, would require works in every ravine, creek and canyon throughout the entire mining field. Being solely in the interest of navigation, and not in connection with the prosecution or resumption of hydraulic mining, the above estimates are presented. In the report of the board, estimates were presented for dams and restriction works and also for winddams. The latter, when mentioned, were solely for improvement of the Feather and Sacramento rivers.”

The amendments suggested for any bill on the debris matter are to erase the words “winddam” and “where now situated,” and to designate points where other dams and restriction works are to be located, viz, restriction works on the Yuba river below De Guerre point, a dam at De Guerre point on the Yuba river and a dam at Van Geisen's on the Bear river.

The California mining committee will appear before the Senate committee on Thursday and the House Committee on Mines and Mining on Friday. To-day the committee was granted a hearing before the House Committee on Rivers and Harbors, notwithstanding the fact that the last day for public hearings had long since passed. Caminetti first spoke on the needs of the Sacramento and San Joaquin rivers, and then gave way to Judge Searlee, who made an able, logical and unanswerable address.

He said he was not speaking for the miners, but for all the people who wanted natural avenues of commerce preserved. He proved that if steps were now taken to impound the debris it could be done at a cost of about one-half cent a cubic yard, while, if the plan of dredging from year to year was adopted it would cost every time any dredging was done, at least 15 cents a cubic yard. He was closely questioned by Chairman Blanchard, who does not seem to want to give California anything, and in every instance the arguments of the latter were clearly confuted. The estimates of the War Department for the improvement of these rivers amount to about \$50,000. It is thought by the Californians that the committee will agree to give about \$125,000. This will still leave the mining debris bill to work on, and the Senate may push the figure up considerably.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING MARCH 1, 1892.

470,149.—FEED FOR NAIL MACHINES—M. Altmeier, Oakland, Cal.

470,150.—NAIL-ROLLING MACHINERY—M. Altmeier, Oakland, Cal.

469,891.—RIVETING MACHINE—M. Arnold, S. F.

469,848.—LAWN FOUNTAIN—W. N. Best, Los Angeles, Cal.

469,962.—MACHINE FOR UPSETTING TIRES—E. Chaquette, S. F.

469,734.—MACHINE FOR SAWING WOOD—J. P. Currie, Marcus, Wash.

470,104.—WOOD-SPLITTING MACHINE—C. J. Dante, Hillsborough, Or.

469,833.—WASH BENCH AND WRINGER—R. Davis, Modesto, Cal.

469,777.—MANUFACTURE OF ASPHALTUM—H. A. Diehl, S. F.

470,153.—TUBULAR METALLIC POLE—D. Dorward, S. F.

469,896.—CASH AND PACKAGE CARRIER—Julius Finch, S. F.

469,783.—PUNCH—J. W. Graves, Lathrop, Cal.

470,125.—CAR—Heacock & Lovejoy, Portland, Or.

470,052.—BOILER FURNACE—E. W. Jones, Portland, Or.

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470,004.—FILTERING FAUCET—H. H. Luse, S. F.

470,059.—EARTH AUGER—B. Lane, Carlton, Oregon.

470,165.—CAN-LABELING MACHINE—C. E. Newell, S. F.

470,164.—FOUNTAIN FOR PASTING MACHINES—C. E. Newell, S. F.

470,166.—CAN-LABELING MACHINE—C. E. Newell, S. F.

469,900.—MAGAZINE SHOTGUN—W. H. Ostrander, Merced, Cal.

469,947.—RAIL FASTENING DEVICE—W. S. Phelps, S. F.

469,899.—HOOP OR BAND TIGHTENER—Chas. Sparks Sacramento, Cal.

470,086.—HYDRAULIC STUMP EXTRACTOR—A. Taylor, S. F.

469,847.—PURIFYING GAS—J. Wiesender, S. F.

470,089.—CAR—D. W. B. Williams, Prescott, A. T.

The following brief list by telegraph, for March 1, will appear more complete on receipt of mail advices:

California—Virginita M. Cone, Alameda, heat regulator for cooking stoves; John D. Hooker, Los Angeles, hydrant valve; John Lamburn and R. Richards, Dixon wheel plow; Dr. F. Oliver, Oakland, cultivator; Robert F. Phillips, San Diego, dental mouth mirror; Francis A. Potter, San Francisco, fruit jar; Henri Vignoe, San Diego, time valves operating mechanism; William Wedgwood, San Francisco, can-capping machine. Oregon—David W. Freeman, Fishhawk adjustable clutch or coupling device; Mathias Jensen, Astoria, can-capping and crimping machine. Washington—Frank P. Burkhardt, Spokane Falls, mechanical movement; Isaac N. Hennes, Ilwaco, steam excavator; John Redmond, Seattle, electric car brake. Utah—James Hoop, Ogden, beam-bolting apparatus.

New York—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

COMSTOCK S. M. Co., March 9th. Object, to operate the McArthur Forrest process in Storey, Lyon and Ormsby counties in Nevada. Capital, \$2,000,000. Directors—H. A. W. Tabor, P. G. Gow and T. L. Wiswall of Denver, Colo.; W. H. Garlick of Shasta, Cal.; A. B. Paul, D. W. Balch and A. B. Paul Jr. of this city.

CALIFORNIA AND NEVADA G. & S. EXTRACTION CO., March 9th. Object, to operate in Mono and Inyo counties in this State and Esmeralda and Douglas in Nevada. Capital stock, \$1,000,000. Directors—W. H. Garlick, John Mullien, George T. D. and H. Balch.

SITKA CONS. M. Co., March 9th. Location, Alaska. Capital stock, \$3,000,000. Directors—Gustav Niehaus, Rudolph Neumann, W. W. Gollin, Leon Sloss, George W. Sessions and Louis Sloss Jr.

A NEW MILL on the McArthur-Forrest system is being put up at The Needle, on the Colorado river, San Bernardino county, by Mr. Blake. The works are to have a capacity of 100 tons per day.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

MAGAZINE SHOTGUN.—Willis H. Ostrander, Merced. No. 469,900. Dated March 1, 1892. This invention relates to certain improvements in that class of weapons known as magazine guns, or repeaters. It is especially applicable to shotguns having two barrels upon a single stock. It consists of a stock having two barrels mounted thereon so as to slide forward and back, a mechanism whereby loaded shells are carried from the magazine and introduced into the barrels of the gun, and in certain details of construction in connection therewith. It is an improvement on a former patent by the same inventor, dated April 21, 1891, numbered 450,773.

HOOP OR BAND FASTENER AND TIGHTENER.—Charles Sparks, Sacramento. No. 469,889. Dated March 1, 1892. This invention consists in the novel construction, combination and arrangement of the screw-seat, or shell, the screw and the nut; and it consists, also, in combination with said screw-seat or shell and nut, of the means for connecting to them the ends of the hoop or band. The object of this invention is to provide a simple, economical and effective means for fastening and tightening hoops, hands and straps of all kinds.

CASH AND PACKAGE CARRIER.—Julius Finch, S. F. No. 469,896. Dated March 1, 1892. This is one of that class of cash and package carriers in which a basket is lifted by suitable hooks into engagement with the forks of a car traveling on a track above. The invention consists in a novel automatically-operating locking device for securing the crossheads of the basket rails to the car forks, in a spring attachment for the ordinary crosshead hook, and in a guard for the car forks.

RIVETING MACHINE.—Matthew Arnold, San Francisco. No. 469,891. Dated March 1, 1892. In this the inventor employs a horizontally-moving carrier with jaws, which are opened when the carrier is advanced to take a rivet from the delivery chute and transfer it beneath the punch, by which it is afterward forced down through the material upon the anvil. The inventor also shows a vertically-moving presser-foot, through which the rivet and punch pass, said presser-foot also being actuated in a vertical direction and having yielding springs, by which, after the presser-foot has been forced down upon the substance to be riveted, its shank is allowed to continue the movement in unison with the movement of the punch, until the rivet has been secured. By the construction described in the patent the inventor is enabled to leave the anvil in a stationary position and to properly guide and hold the rivet until the punch has forced it into the material, the vertically acting presser-foot acting in this capacity. It also greatly simplifies the mechanism necessary for the operation of the machine, dispensing with all devices and connections beneath the table for the movement of the anvil.

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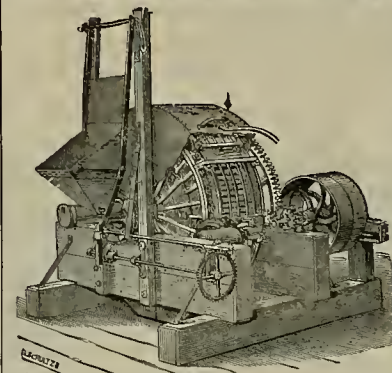
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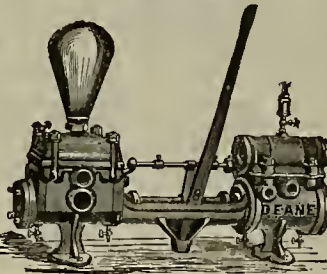
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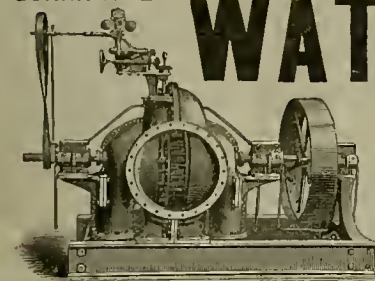
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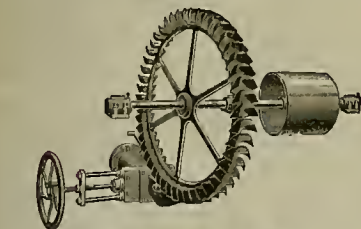
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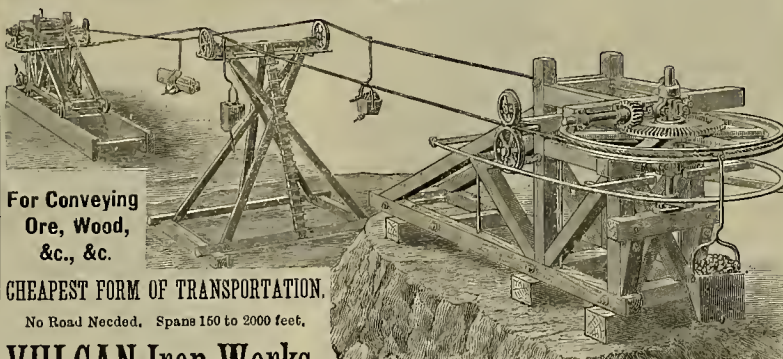
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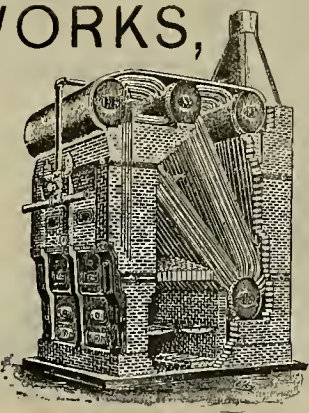
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 10, 1892.

General trade begins to pick up, yet the uncertainty regarding the weather for the next 30 or 60 days will have considerable influence on distributive orders from the rural districts. The hot wave of last Monday and Tuesday did not do any material damage, and as cooler weather prevails now, no fears are felt regarding grain crops even on adobe land. The plant in most places has made too rapid growth, so that if a week or two of cool weather would set in, better crop results will follow. The threatened labor strike has apparently passed. This is said to be due to employers organizing for mutual protection. It is also claimed that this, their first decided success, will undoubtedly give them confidence to make bids for work without fearing strikes before the contract work is finished. Raw material continues to favor iron foundries and iron workers in general.

The local money market shows signs of oversupply. There is absolutely nothing of an inviting character for investors, but all appear hopeful that the future has better things in store and that opportunities for profitable investments will open up. The money markets at the East are reported fairly easy. The outward movement of gold does not appear to have any visible effect. This is reflected in the strong speculative character of railroad and other American securities in the face of heavy unloading by many large English merchants and dealers and manufacturers of various very wealthy class and large, or in fact, any market at all they were, of course, the ones that had to be sold. With a concentration of American securities, a big boom, based on merit, is among the certainties in the near future.

MEXICAN DOLLARS—The market is steady at around 7 1/4 cents.

QUICKSILVER—Receipts the past week aggregate 350 flasks. There is a fair demand. The exports by sea the past week aggregate to Mexico 10 flasks.

SILVER—The market strengthened under prospective favorable action by Congress on the free coinage bill, only to fall back again with the receipt of unfavorable advices. Two years ago, speculators at home and abroad entered the market and ran prices up quite high, but as time passed a gradual settling in prices set in, which ended this year with a lower range touched than ever before recorded. The decline entailed heavy losses on the bulls, from which they are slow to recover and which will keep other operators from entering the market on the bull side in expectation of much higher prices through favorable legislation by Congress. The feeling of conservatism is strengthened still further by a generally accepted belief that Pres. Harrison will veto any free coinage bill passed, and that if he does, the friends of bimetalism cannot rally a two-third vote to pass it over his head. English exchanges are, as a rule, more favorably disposed toward bimetalism, and are hopeful that an international monetary convention may result in favorable action being taken looking to remonetizing silver. The closing down of a large number of silver-producing mines is curtailing the production of silver very materially.

BORAX—Exports by water the past week aggregate 2019 cts. to New York. The market is steady at combination prices.

LIME—Receipts the past week aggregate 7114 bbls. This is the largest receipt within one week ever before recorded. There is a good export and home demand.

ANTIMONY—The market is easier at shading prices. New York mail advices quote as follows: 100% at 11c for Hallet's; 12 1/2% for L.N.; and 15c for Cook's, in wholesale quantities.

PIG IRON—The market is reported barely steady for both spot and to arrive, owing to the large foundrymen having freer supplies and not being disposed to enter the market except on forced concessions. In view of the favorable outlook for the wheat crop, the consumption on this coast is quite large. Eastern mail advices continue to note active competition on the part of Southern furnacemen, with lower prices quoted. This naturally is bringing in more buyers and, at the same time causing many pig-iron producers at the North to report their stocks. London cables to Iron Age report a stronger market for warrants, which is attributed chiefly to threatened labor difficulties and rumors that several large concerns have given notice of stoppage of operations during the fortnight commencing with the 13th inst., when trouble with the collieries is expected.

TIN—Imports the past week aggregate 31,470 boxes plate. The market is barely steady. It is claimed that a renewed demand is expected to set in soon, but even with this, no improvement in prices is looked for.

LEAD—The market appears to have a steadier tone. New York mail advices state that the market is grounding around bottom.

COPPER—Exports by sea the past week aggregate 2470 cts. of matte to New York. London cables to Iron Age, March 3rd, report as follows: "Good buying of forwards has imparted some confidence, but this demand has been taken advantage of by holders willing to secure profits. Outside speculative interest is still of moderate proportions. Business in furnace material has been on a large scale, including contracts for 3000 tons Anaconda matte, deliverable 1000 tons a month, at a sliding scale of prices to be governed by the movement in selling prices of merchant bars. It is reported that a French syndicate is forming to acquire Anaconda mine properties, and should the project be successfully carried out, the affairs of the company will be controlled by an Anglo-French board of directors."

COAL—Imports the past week aggregate as follows: Cokes 67,000 tons; bituminous 5902, Philadelphia 200, Seattle 600, Greenock 1581, Newcastle Bay 220, total 113,331 tons. The market for cargoes in all positions is slow, with buyers well supplied. The outlook is not at all favorable for an improvement in prices unless the wheat crop has a setback within the next 60 days.

Eastern Metal Markets.

New York, March 10.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	41 1/2	90 1/2	10 50	4 15	19 55
Friday.....	41 1/2	90 1/2	10 50	4 15	19 50
Saturday.....	41 1/2	90 1/2	10 50	4 15	19 50
Monday.....	41 1/2	90 1/2	10 51	4 15	19 50
Tuesday.....	41 1/2	90 1/2	10 50	4 15	19 50
Wednesday.....	41 1/2	90 1/2	10 50	4 20	19 50

The metal market shows no strength, with the general tendency toward higher prices. The option gains ground that much more active times are near at hand. Borax is steady. Quicksilver strong.

Mining Share Market.

SAN FRANCISCO, March 10, 1892.

Mining shares the past week were dull and lifeless. Considering the bear points put out for lower prices and that the stock pool is evidently manipulating with that end in view, the market holds up remarkably well. To more effectively conceal their purpose and throw the odium of low prices and no life to the market on others, inside manipulators through and by means, best known to themselves, are trying to make it appear that the unfavorable condition of the market is due to the Brokers' Combine trying to get outside shareholders to join forces so as to fight them (the stock pool). By referring to the action of the market the past two months it will be seen that had it not been for the combine forcing insiders to enter the market for shares with which to control the election of Sierra Nevada, Belcher and of Hale and Norcross, we would not have seen the market value for those stocks double and treble in price just before election day. The advance in these stocks carried more activity into other shares and created a higher range of values. Many shareholders sold out on the advance and in doing so they did well financially. In this connection it is well to revert back to the time when the late Senator Sharon and W. C. Ralston, both of the Bank of California, George H. Schultz as a free lancer, and the bonanza people (Fair, Flood and Mackay) were in the market as contestants. When there were active times and high fluctuating prices, as such as the stock pools and mill-rings were organized and formed into a trust company, the market and mines became a prey to financial vultures and the business went to the "bow wows." It is for the purpose of reforming the business that the Mining Stock Association was organized to look after the mines, and still later leading commission brokers combined to look after the stockholders. One was in demanding that it now looks as if success will crown their efforts and a new order of affairs for the better follow. There were two good points made by J. H. Tingman, secretary of the Mining Stock Association, in his protest against the management of the mine and demanding that certain reforms be made, which was read and unanimously adopted at the meeting of the Hale and Norcross shareholders. One was in demanding that both car sample and battery assays be given of all ores taken out and milled. The other was that no ore be reduced at any mill not owned or leased by the company. A failure to comply with the above and other demands will place the newly elected Board of Directors in a criminal position.

It is gratifying to see J. L. Flood, the young mining magnate, posing as a reformer. The many skeptics as to the sincerity of his motives will be convinced of their error of judgment if Mr. Flood insists on the superintendent of Con. Virginia giving car sample assays as well as the battery assays. He might even go still further in the good work by having the Board of Directors of the company lease the mill which reduces the ore. Mr. Lyman, superintendent of Con. Virginia, mine, says he acts under instructions from both Mr. Flood and Mr. Mackay, and Mr. Mackay says that car sample assays are a check against mill stealing.

The market opened this morning weak at lower quotations. After call, Hale & Norcross sold down to \$1 a share. The rest of the market shaded off from \$5 to 10 per cent. The next election contest will be for Crown Point, which in turn will be followed by that for Savage.

By those in position to know, it is claimed that there is quiet but persistent buying on the street of Quilotoa stocks. To facilitate the buying, low quotations are made on Call. In the Bodie shares, trading has been light, while the "Razor Blades" have been let severely alone.

News from Con. Virginia stock mines is uniformly good and affords no reasonable excuse for levying assessments. It looks as if it is done so as to force outsiders to sell their holdings before the reforms in the mining and milling of ore, that this paper has consistently advocated, are brought about. When the reforms are made so as to conform to the law under which the companies incorporated, then, and not until then, can the outside investor expect to derive any benefit from investing in the shares of the mines. Ophir and two other of the north end mines should be paying dividends; but instead, an assessment is talked of. In Con. Virginia they have high-grade ore which ought to allow of dividends being paid. In Best & Belcher, they are developing rich ore to the west. In Savage, on the Nevada level, near Gould & Curry, they are in about 40 feet of fair to high grade ore, the general average going high enough to admit of 50-cent, if not more, dividends being paid. This is the most important find reported for some time. Hale & Norcross has always been noted as having good to high grade ore, and now that the mine has to be worked to conform to the instructions of stockholders, it is not out of place to believe that the ore later named again, which will be as good as the company's lease a mill. No mention is made of the 50-foot wet ledge in Chollar, as is there a suspicious silence about the rich ore found to the west in several of the Gold Hill mines. From the Quilotoa district our advice report important work under way in two of the mines. From the Bodie district our advice report the mine is being worked, and that summer will have some ore milled soon. All the mines report encouraging work. Advices from the Tuscarora district are uniformly favorable, but the money received from the sale of ore does not materialize into dividends.

San Francisco Metal and Coal Market.

ANTIMONY.		THURSDAY, March 10, 1892.	
Per lb.	@	English.	@
Refined, in car lots	8 1/2	B'k Diam'd tool	9 1/2
Powdered, do	8 1/2	Pick & Hammer	8 1/2
Concentrated, do	7 1/2	Machinery	8 1/2
All grades jobbing at advance		For Calc.	14 1/2
COPPER.		TIN.	
Bolt	22 1/2	B. V. steel grade	21
Sheeting	22 1/2	1420, spot	6 00
Ingot, jobbing	22 1/2	1420, 1420	6 00
London, wholesale	22 1/2	Do, roofing, 1420	6 00
Fire Box Sheet	22 1/2	Do, do, 1420	6 12 1/2
IRON.		PIG TIN.	
Bar, base	3 1/2	Spot 3 1/2, irreg.	21
Norway, base	4 1/2	ular nominal	21
COAL.		STEEL.	
Eglington by ton	26 00	Wilmington	28 00
Giangamco by ton	26 00	Gretta	7 25
Am. Soft, No. 1	30 00	Nanaimo	7 25
Oregon No. 1	30 00	Shima	7 25
Puget Sound	30 00	Seattle	7 00
Clay Lane White	25 00	Coos Bay	6 00
Shore No. 1	26 00	Channel	8 50
Langdon	26 00	Do, 1420	14 00
Thorndike	26 00	Overland, in	15 00
Gardsherr	26 00	Do, bulk	14 00
Barrow	26 00	Wallsend	7 50
Carbondale	26 00	Scott's Split	8 00
Pertone	10 00	West Hartley	8 00

LEAD.		TO LOAD - PER TON.	
Fig.	4 1/2	Australian	7 00
Bar.	4 1/2	Peru cop. am.	7 00
Sheet	7 1/2	Scott's Split	6 50
Pipe	6 1/2	Cardiff	7 00
SHORT.		LUMBER.	
(Discount 10c on 500 bags.)		Cumberland	21 00
Drop, 3/4 bag	1 30	Do, 1420	21 00
Book, 3/4 bag	2 10	West Hartley	12 00
Chilled, do	2 30	Do, 1420	12 00
QUICKSILVER.		ENGLISH.	
Home trade, pr.	43 00	Do, spot, in bulk	11 00
For export	43 00	Do, in sacks	13 00

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COMPANY AND LOCATION.		ASSESSMENTS.	
Andes M Co, Nevada	38	LEVINE, DELING AND SALE	SECRETARY.
Best & Belcher M Co, Nevada	51	March 8, April 11, April 29	J W Twigs, 399 Montgomery
Bodie M Co, Nevada	40	March 8, April 7, April 29	L Osborn, 399 Montgomery
Butte M Co, Nevada	40	March 8, April 16, May 3	C L Perkins, 331 Pine
Cal Verde Antique Marble Co, California	2	Jan 25, Feb 27, Mar 28	V Gadsden, 119 Buft
Con Imperial M Co, Nevada	33	Feb 2, Mar 7, Mar 28	W J Gurnett, 318 Pine
Evening Star M Co, California	3	Jan 22, Feb 25, Mar 16	O L McCoy, 331 Pine
Goldfield M Co, Nevada	3	Jan 20, Feb 22, Mar 12	J J Seville, 321 Sansone
Hall River Con M Co, California	3	Jan 22, Feb 25, Mar 17	C E Elliott, 309 Montgomery
Imperial M Co, Nevada	33	Feb 24, April 2, April 29	L Ossel, 119 Buft
Found Treasure M Co, Nevada	7	Jan 19, Feb 24, Mar 17	J W Pew, 310 Pine
Golden Fleece M Co, California	16	Jan 30, Mar 24, May 7	W J Gleason, Phelan Block
Golden Prize Con M Co, Nevada	5	Feb 24, April 2, April 23	O D Bennett
Keystone Con M Co, Nevada	5	Feb 9, Mar 15, Apr 5	E Oliver, 22 Mint Ave
Keystone Con M Co, California	2	Jan 23, Feb 25, Mar 15	C L McCoy, 331 Pine
Los Gatos Lime Co, California	2	March 9, April 19, May 9	J H Isham, 310 Pine
Martin White M Co, Nevada	27	Jan 11, Feb 23, March 25	W S Somerville, 323 Montgomery
Middle Creek M Co, British Columbia	2	Jan 8, Feb 11, Mar 12	R L Ross, 120 Sutter
North Belle Isle M Co, Nevada	19	Jan 16, Feb 24, Mar 25	H D Hawk, 318 Pine
Northwestern G & S M Co, British Columbia	4	March 1, April 5, May 3	J W Pew, 310 Pine
Original Keystone M Co, Nevada	3	March 4, April 14, May 7	F Bonacina, 438 California
Overman M Co, Nevada	12	Feb 10, Mar 16, Apr 6	F E Lyle, 330 Pine
Pear M Co, Arizona	12	Feb 21, March 28, April 23	A H Fish, 309 Montgomery
Pine Hill M Co, Nevada	1	Feb 11, March 24, April 15	Chas A Hare, Steuart St
Savage M Co, Nevada	75	Feb 2, Mar 8, Mar 28	E B Holmes, 309 Montgomery
Sierra Nevada M Co, Nevada	10	Feb 1, Mar 4, Mar 24	E L Parker, 309 Montgomery
Union M Co, Nevada	14	March 8, April 11, April 29	A H Fish, 309 Montgomery
Weldon M Co, Arizona	5	Feb 9, Mar 15, Apr 14	A Waterman, 308 Montgomery
Yellow Jack M Co, Nevada	50	Feb 2, Mar 4, Apr 2	W H Blawie, Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	MEETING.	SECRETARY.	DATE.
Evening Star M Co.	Annual.	J J Seville, 320 Sansone.	March 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Champion M Co.	10	T Wetzel, 320 Sansone.	Aug 16
Cos Cal & Virginia M Co, Nevada	50	A W Havens, 309 Montgomery	Aug 17
Ophir M Co.	30	E M Hall, 514 Montgomery	Sept 10
Union M Co.	25	E P Bush, 101 Sansone	Jan 5
Great Western Quicksilver M Co.	25	A Halsey, 323 Montgomery	Oct 1
Idaho M Co, Grass Valley	3 00	Grass Valley	Aug 4
Mayflower Gravel M Co, California	60	D M Kent, 330 Pine	Aug 20
Pacific Coast Borax Co, California	1 00	A L Clough, 323 Montgomery	Feb 10
Standard Cons M Co, California	10	J W Pew, 310 Pine	Jan 28

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 18.	WEEK ENDING Feb. 25.	WEEK ENDING March 2.	WEEK ENDING March 9.
Alpha.....	.50	.55	.35	.35
Alta.....	1.00	1.15	.60	.50
Andes.....	70	75	80	75
Belcher.....	1.20	1.50	1.20	1.00
Bodie Isls.....	.25	.30	.25	.25
Beet & Belcher.....	.25	2.90	1.25	2.35
Bullion.....	.65	.75	.60	.50
Bodie Co.....	.55	.65	.50	.60
Bulwer.....	.45	.50	.40	.45
Commonwealth.....	.20	.15	.20	.15
Con. Va. & Cal.....	.45	5.50	4.05	4.50
Excelsior.....	1.00	.75	1.05	.80
Chollar.....	1.65	1.90	1.30	1.25
Confidence.....	.25	2.85	2.25	2.50
Con. Imperial.....	.05	.05	.10	.05
Caledonia.....	.20	.20	.10	.10
Calaveras Point.....	1.25	1.45	1.20	.90
Crocker.....	.05	.10	.05	.05
Del Monte.....	.65	.80	.60	.45
Eureka Con.....	2.00	....	1.75	1.65
Excelsior.....	10	....	10	....
Grand Pri.....	10	....	10	....
Gould & Curry.....	1.50	1.80	1.20	1.40
Hale & Norcross.....	1.80	2.90	2.60	1.70
Julia.....	.55	.35	.30	.40
Kentuck.....	.20	.25	.15	.10
Lady Wash.....	.20	.25	.20	.25
Mono.....	1.00	1.15	.90	.85
Nevada.....	1.75	2.20	1.95	1.60
New Belle Isls.....	.20	.25	.10	.15
Nev. Queen.....	.25	.45	.30	.25
Occidental.....	.55	.60	.40	.35
Savage.....	.35	3.05	2.50	2.30
Overman.....	.80	.95	.55	.60
Potosi.....	1.65	1.58	1.15	1.25
Peerless.....	....	.05	.05	....
Peru.....	1.25	1.45	1.35	1.15
S. B. & M.....	.50	.55	.30	.35
Sierra Nevada.....	1.50	1.65	1.30	1.75
Silver Hill.....	.15	.25	.10	.10
Union Con.....	1.60	1.70	1.30	1.45
Utah.....	.35	.45	.30	.25
Yellow Jacket.....	.90	1.05	.95	.75

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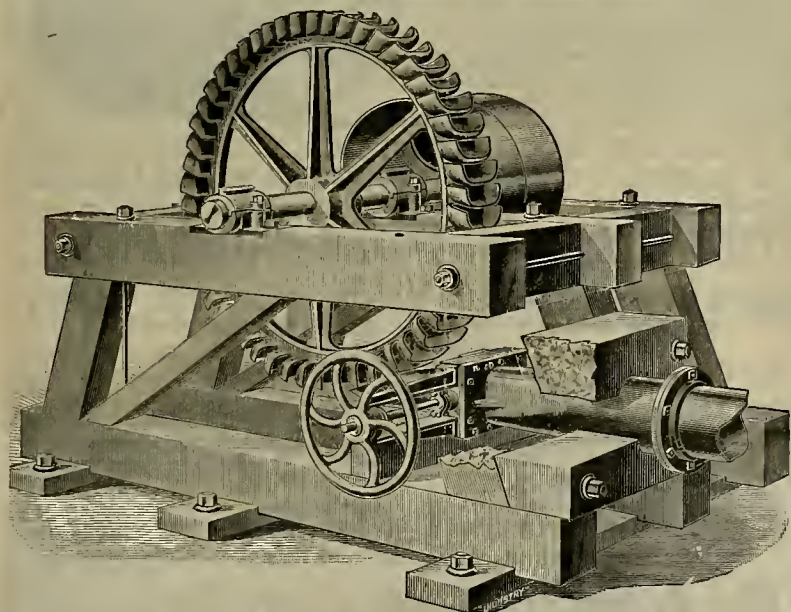
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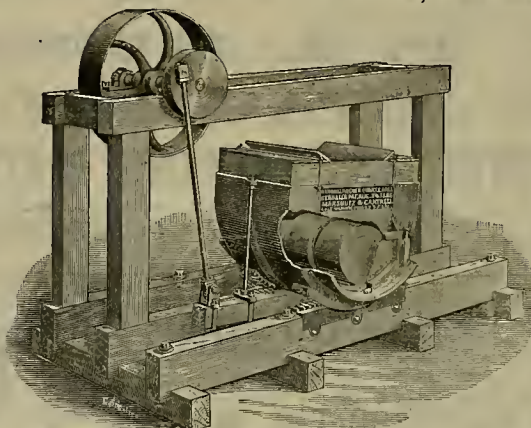
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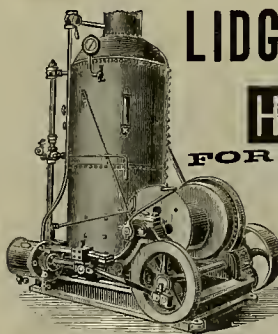
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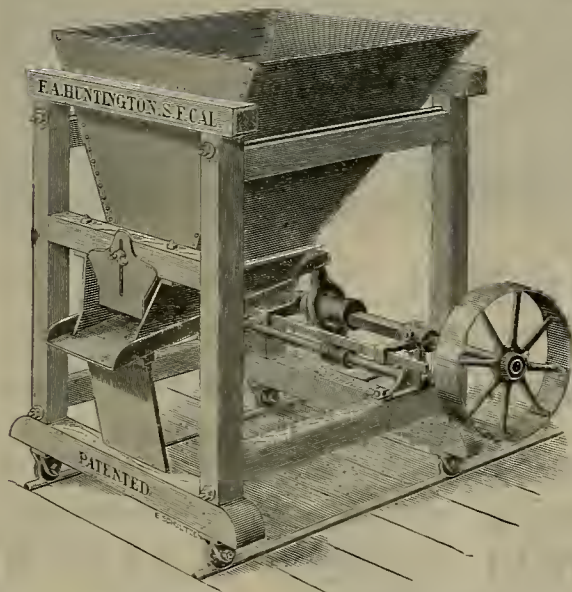
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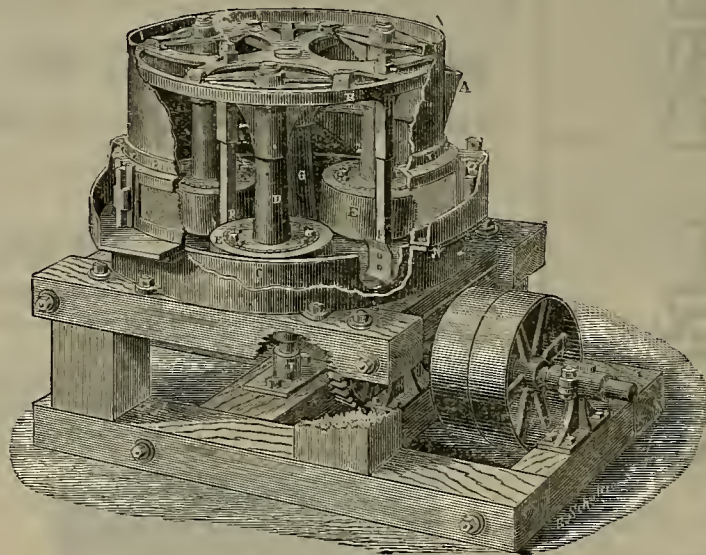
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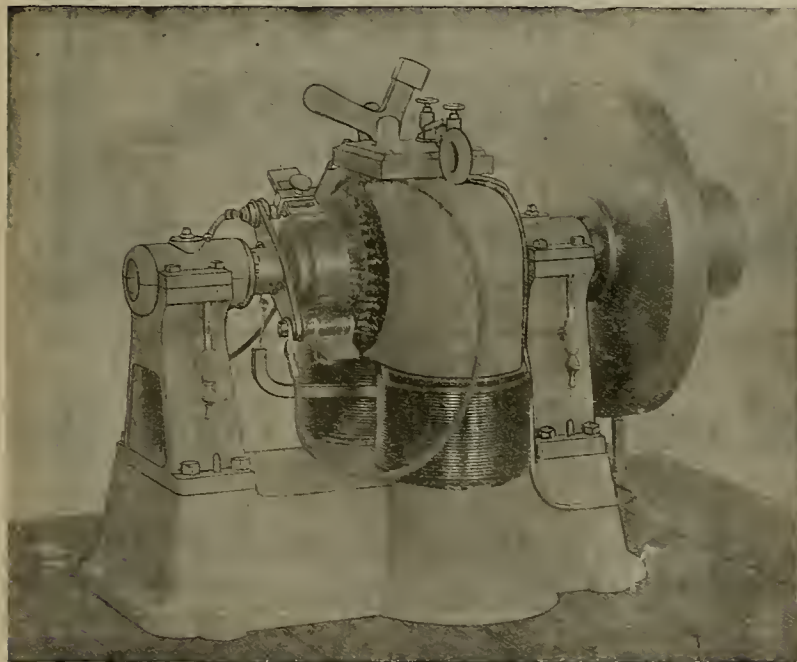
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First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight riffling surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight rifflings also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better belt than has ever been manufactured for use on this coast. It will last much longer and will handle fully one-third more pulp than any smooth belt, and will save a higher percentage of sulphurets.

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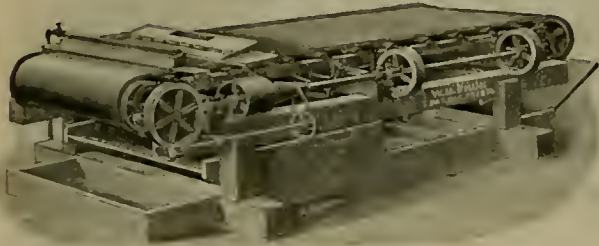


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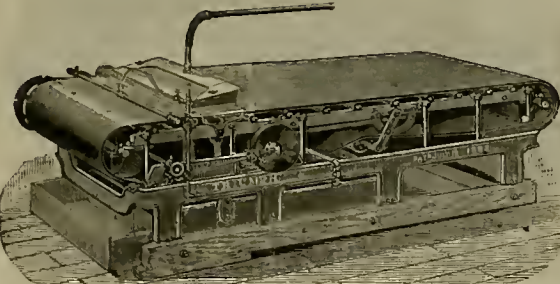
GLADSTONE MINING COMPANY, C. J. Clark, M. E. Genl. Supt. FRENCH OULCH, Calaveras Co., Cal., Dec. 12, 1891.
MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIR: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the Frue in first place. When I built this mill (20 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for TWELVE MONTHS. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and baffle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from \$5 to \$20 per ton and the tailings from nothing to 60 cts. per ton. I will conclude by saying that I cannot endorse the six-foot Frue Vanner too highly, and it is the only table that I would have in my mill.
C. J. CLARK, Genl Supt.

Price of 4-foot wide Plain Belt Frue Vanner..... \$550, f. o. b.
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For any information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.
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(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

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Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
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It having come to the notice of the undersigned that their patent rights are being infringed upon, intending purchasers are hereby warned that all such infringements will be duly prosecuted. (Signed) THE PELTON WATER WHEEL CO.

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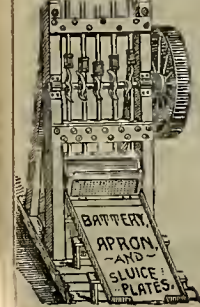
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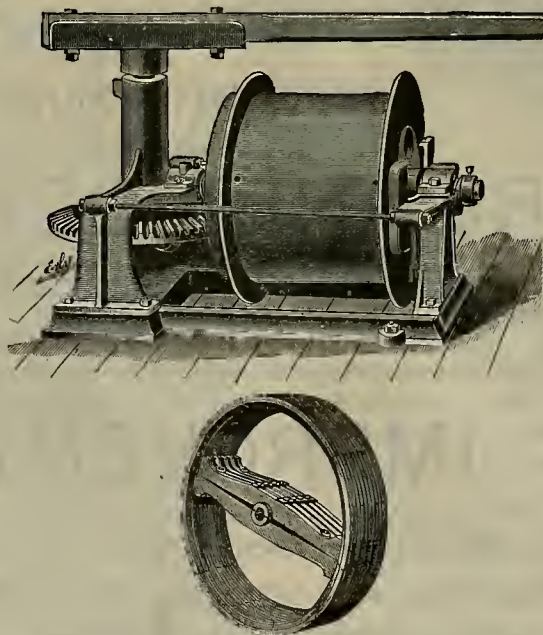
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV. — Number 12.
NEWY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MARCH 19, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Copies of Patents.

The Commissioner of Patents has just issued a brief official notice to the effect that "in consequence of want of room for the proper storage and arrangement of printed copies of patents, it will be impossible to fill orders in current issues until additional room is provided by the proper authorities." This means that a man who obtains a patent will be given his original document, but that he cannot obtain other printed copies from the Patent Office, even if he pays for them. Copies of back numbers may be obtained, but none after the issue of March 8th.

This is a decidedly backward step for the U. S. Government to take in its Patent Department. Every inventor wants one or more copies of his patent, and it ought to be furnished him at a nominal price as has always been the case.

The Patent Office is one of the few departments which pays all its own expenses and also yields a profit to the Government, yet that profit is taken away from it and transferred to the General Fund, and the Patent Office itself is crowded with work and needs more help, which it cannot

get because of lack of funds. This is an anomalous state of affairs. Public business is delayed; inventors are put to inconvenience, and now they are even told that they cannot get copies of their patents because there is no room to store or arrange printed copies.

The additional room needed to store these copies should be provided without any delay whatever. There are hundreds of firms which buy copies of all those patents connected with their special business, but this they can now no longer do. It seems a very poor reason to give—lack of room for storage and arrangement—for stopping the printing of copies. It would seem as if this room could be readily provided for each an important purpose. The circular of the Commissioner of Patents will doubtless have the effect evidently intended, viz: draw the immediate attention of the proper Congressional Committee, so that a remedy will be applied as soon as may be.

THE CYANIDE PROCESS.—We shall, next week, publish a full description of the McArthur-Forrest process, written by one of its originators. The process is just now attracting wide attention. It has been introduced recently in this State, and other plants are shortly to be started.

The Miners' Committee.

The committee of the California Miners' Association had its hearing in Washington on Tuesday before the House Committee on Mines and Mining. Judge Searles made a long argument, making every point clear to each committeeman. The feature of the day was the presence in the committee room of many Congressmen, who deserted the main hall to listen to Judge Searles' speech, and every one of them manifested a strong interest in the matter, joining in asking questions after the speaking had

concluded. Another hearing will be given in a few days, when Mr. Luttrell and Mr. Hobson will speak.

It is significant of the energetic work performed by the miners' representatives that members of Congress came to the committee rooms to hear the arguments on hydraulic mining. An interest has been aroused in the subject among the Congressmen which augurs well. The miners want the subject investigated thoroughly and want it understood clearly. The difficulty has been, heretofore, to get a hearing of any kind, on account of the prejudice which has existed.

When it is clearly shown, as it can be, that they only want to operate these mines on conditions which prevent injury to farming lands or rivers, little difficulty will be experienced in obtaining aid of some kind from Congress.

The California representatives in Congress have in every way assisted the Miners' Committee, and for once have pulled together in one direction. The members of the Committees on Rivers and Harbors and Mines and Mining have manifested unusual interest also. Dr. David T. Day, Chief of the Division of Mining Statistics and Technology of the U. S. Geological Survey, has also greatly assisted the Miners' Committee. He is an honorary member of the Execu-

tive Committee of the California Miners' Association, and a very active, energetic worker. Several other gentlemen have also given valuable assistance. The Nevada Senators are also very friendly to the proposed appropriation.

On another page of this number of the PRESS is printed in full the Caminetti bill on Hydraulic Mining, which miners will do well to read. It is one of the three bills now pending. The others were introduced by Congressman Geary and Senator Felton. It is hardly probable that as much of an appropriation as was desired will be made

this session; but at the same time, it is certain that some step in advance will be made. Congress is being educated as to what hydraulic mining means for the State and the nation, and it is only a question of time when its importance will be fully recognized.

The Ball Engine.

We take pleasure in bringing before the notice of steam users, in this week's issue, a cut of the Ball engine, of what is known as the tandem compound high-speed type. This make of engine is superior for electrical application (electric lighting, railroad plants, etc.), and it is now being introduced very extensively throughout the State. In every place where the engine has been in operation, it is giving entire satisfaction, not only succeeding in performing what is claimed for it, but exceeding the expectations of the builders as well as the purchasers.

Among the many plants which have been recently arranged, is the new electrical one of the Sbaron estate in the Palace hotel building, which has been fitted up with a number of these engines, and is now in perfect running order.

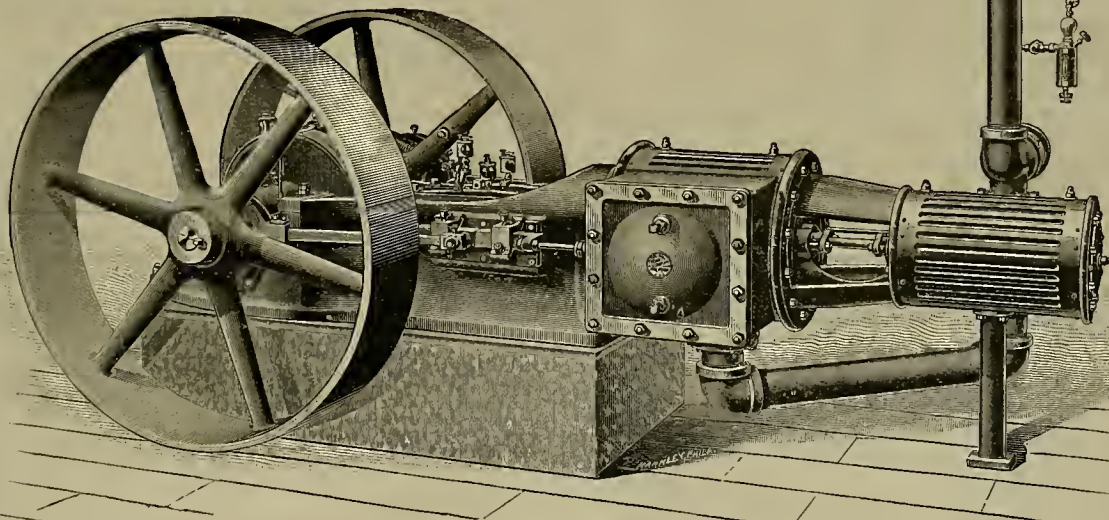
Among the special features claimed for this engine are its simplicity and compactness; the solidity and strength of the bed; the unusually large bearings and wearing surfaces; excellent material and workmanship; durability; the smooth and quiet running of engine.

The advantages which this engine possesses consist of a high-pressure valve, with its connections on one side of the engine, and a low-pressure valve and valve motion on the other. This arrangement (which is patented) makes the moving parts readily accessible and avoids complexity and unsatisfactory results of other forms of valve motions.

There has also recently been added an improvement in the way of a hand-hole on one side of the low-pressure cylinder, giving facilities for examination of its interior, the condition of packing rings and fastening of piston head to its rod.

The fuel economy is about the best attainable for an engine of its type, and it is claimed that it will maintain this economy for a much longer period than is possible with any of the various forms of engines on the market. The engine, as shown in the cut, will readily commend itself to any fair-minded engineer. The Risdon Iron and Locomotive Works of this city are the coast agents for the various forms of the Ball engine, of which that illustrated is only one. Simple, tandem-compound, cross-compound or triple-expansion can be furnished.

RICH quartz is reported about five miles up the river from Truckee.



THE BALL TANDEM COMPOUND ENGINE.

To Regulate Hydraulic Mining.

Full Text of the Caminetti Bill before Congress.

The following bill was introduced in the House of Representatives, February 29, 1892, by Mr. Caminetti of California. Referred to the Committee on Mines and Mining and ordered to be printed.

Mr. Caminetti introduced the following bill:

The bill is entitled "A Bill to create the California Debris Commission, prescribe its duties, and define its powers, and to regulate hydraulic mining on the tributaries of the Sacramento and San Joaquin river systems, in the State of California."

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a permanent commission is hereby created to be known as the California Debris Commission, consisting of three members, which shall have the authority and exercise the powers hereinafter set forth.

SEC. 2. That the objects and purposes of this act are: First, to construct such restraining and impounding dams, settling basins, relief canals, and other works calculated to protect navigable water ways and channels of the Sacramento and San Joaquin river systems from encroachment of and damage from debris resulting from mining operations, natural erosion, or other causes, and to permanently improve the same; second, to permit, in behalf of the United States, hydraulic mining on the tributaries of said rivers, and the respective branches of such tributaries, under the provisions of this act: *Provided*, That no injury or damage results to the navigable water ways and channels of said river systems.

SEC. 3. That the jurisdiction of said commission in so far as the same affects hydraulic mining shall extend to all such mining situated on the tributaries of said rivers and the respective branches of such tributaries the owner or owners of which elect to avail themselves of the privileges of this act.

SEC. 4. That the Secretary of War shall, within ten days after the approval of this act by the President of the United States, detail three officers of the Engineer Corps of the United States Army to constitute said commission. He shall also in like manner fill any vacancy that may occur therein.

SEC. 5. That the office of said commission shall be at the city and county of San Francisco to said State.

SEC. 6. That said commission shall organize within thirty days after its appointment by the election of a president, secretary, and such other officers and assistants as may be deemed necessary in the transaction of its business and performance of its duties. It shall also adopt such rules and regulations, not inconsistent with law, to govern its actions and the method of procedure for mine owners to avail themselves of the privileges conferred by this act.

SEC. 7. That the members of said commission and the secretary thereof are hereby authorized and empowered to administer oaths.

SEC. 8. That it is hereby made the duty of the United States district attorney for the northern district of California to attend in person or by deputy the meetings of said commission when thereto requested, and act as the legal adviser thereof on any matter of law that may arise. He shall also institute such proceedings and actions at law as may be requested by said commission in the enforcement of the provisions of this act, such actions to be commenced in the name of the United States of America.

SEC. 9. That it shall be the duty of said commission to mature and adopt such plan or plans, from examination and surveys already made and from such additional examinations and surveys as it may deem necessary, as will correct, permanently locate and deepen the channel and protect the banks of the said navigable rivers, improve and give safety to the navigation thereof, and promote commerce thereon. Such plan or plans shall be matured with a view of making the same effective as against the encroachment of and damage from debris resulting from mining operations, natural erosion, or other causes, and to restore, as near as practicable and the necessities of commerce and navigation demand the navigability of said rivers to the condition existing in eighteen hundred and sixty.

SEC. 10. That it shall further mature and adopt such plan or plans, from examination, surveys, and information now in the possession of the War Department and from such additional examinations and surveys as it may be necessary to make, as will enable hydraulic mining as defined in this act to be carried on without injury to the navigability of the said rivers.

SEC. 11. That it shall further examine, survey, and determine the utility and practicability, for the purposes hereinafter indicated, of storage sites in the canyons and tributaries of said rivers, and in the respective branches of said tributaries, or in the plains, basins, sloughs, tule and swamp lands adjacent to or along the course of said rivers, for the storage of debris or water, or as settling reservoirs with the object of using the same, by either or all of these methods, to aid in the improvement and protection of said navigable rivers by preventing the deposits therein of debris resulting from mining operations, natural erosion, or other causes, or for affording relief thereto in flood time, and providing sufficient water to maintain scouring force therein in the summer season.

SEC. 12. That it shall further be the duty of said commission to restrain, when appropriations therefor are made by law, by dams or other methods adapted to the purpose, all material lodged in the water ways and channels of the said rivers and the tributaries of each with their branches, in order to better protect said navigable rivers; to note, from time to time, at high and low stages of water, in said water ways, channels and rivers, the amount of material carried in suspension, and make cross-section surveys of the beds thereof at divers places thereon; to examine and estimate, from time to time, the amount of hydraulic mining carried on on each of said rivers or their tributaries, and ascertain what percentage of the material so mined goes into the stream immediately below the restraining works provided at said mine or mines; what portion

thereof goes down the main tributaries of a navigable stream, testing same at different places in the course thereof, and what percentage reaches the nearest point of navigation and from thence is carried in suspension to Suisun Bay, examinations to be made at different points thereon; to investigate such hydraulic or other mines as are now or may have been worked by methods intended to restrain the debris and material moved in operating such mines, by impounding dams, settling reservoirs, or otherwise, and in general to make such study of and researches in the hydraulic mining industry as science, experience, and engineering skill may suggest as practical and useful in devising a method or methods whereby such mining may be carried on without injury to the said navigable rivers.

SEC. 13. That said commission shall submit to the Secretary of War on or before the fifteenth day of November of each year a report of its labors and transactions, with plans for the construction, completion, and preservation of the public works outlined in this act, together with estimates of the cost thereof, stating what amounts can be profitably expended thereon each year. The Secretary of War shall thereupon submit same to Congress on or before the meeting thereof.

SEC. 14. That hydraulic mining, as the term is used in this act, is hereby defined as the process by which a bank of gold-bearing earth and rock is excavated by a jet of water discharged through the converging nozzle of a pipe, under great pressure, whereby the earth and debris are carried by means of water through flumes or otherwise and discharged on lower levels into the natural streams and water courses below.

SEC. 15. That the owner or owners, or, in the case of a corporation, its manager, or agent appointed for that purpose, owning ground in the territory in the State of California mentioned in section two hereof, which it is desired to work by the hydraulic process, may file with said commission a petition, verified before an officer authorized by law to administer oaths, setting forth a particular description of the ground so owned and amount thereof intended to be worked; depth of bank, and character of material constituting same; amount of earth to be moved; quantity of water to be used; number of monitors proposed to be employed; character and extent of dump; a statement of the fall from point of discharge to nearest stream; distance from navigable rivers; what facilities, at the mine, or elsewhere, exist for impounding and restraining debris or settling material carried in suspension after leaving impounding dams, or point of discharge of mine; what, if any, restraining or impounding works and settling reservoirs such owner proposes to build at his or its expense, of what material and at what place, also stating capacity thereof. The said petition shall be accompanied by plans and specifications of restraining and other works proposed to be built, and by maps and surveys illustrating as far as practicable the facts set forth in said petition.

SEC. 16. That the said petition shall set forth the name of the true owner or owners of the mines and lands described therein, and if owned by a corporation, its corporate name, principal place of business, name of officers and directors thereof.

SEC. 17. That said petition shall be accompanied by an instrument duly executed and acknowledged as required by the law of said State, whereby the owner or owners of such mine or mines surrenders to the United States the right and privilege to regulate by law as provided in this act, or any that may hereafter be enacted, or by such rules and regulations as may be prescribed by virtue thereof, the manner and method in which the debris resulting from the workings of said mine or mines shall be restrained, and what amount shall be produced therefrom. It being understood that the surrender aforesaid shall not be construed as in any way affecting the right of such owner or owners to operate said mine or mines by any other process or method now in use in said State.

SEC. 18. That the owners of several mining claims situated so as to require a common dumping ground or dam for the debris issuing therefrom in one or more sites, may file a joint petition setting forth such facts in addition to the requirements of sections fifteen and sixteen hereof. And where the owner of a hydraulic mine, or owners of several such mines, have and use common dumping sites for impounding debris, which sites are located below the mine of an applicant not entitled to use same, such fact shall also be stated in his petition. Thereupon the same proceedings shall be had as provided for herein.

SEC. 19. That upon filing such petition the said commission shall fix a date for hearing of the same at least thirty days after date of filing. Notice of such hearing shall be published for a period of ten days in a daily newspaper published at the city and county of San Francisco, and in a daily newspaper published in the city of Sacramento, notifying all persons that the petition (stating briefly its contents, giving name of owner and location of works), will be heard at such time and place as the commission may determine. Any person desiring to contest same shall file his objections in writing with the secretary of said commission at least five days before date of hearing.

SEC. 20. That pending publication of said notice said commission or committee thereof, if deemed necessary, shall proceed to the mine or mines set forth in said petition, examine same thoroughly, and inspect the topography of the ground below point of discharge of the said mine or mines.

SEC. 21. That on the day set for hearing thereof, or at such time as the same may have been postponed, the petition shall be heard in the following order, proceedings being conducted under oath: First, petitioner's proof, oral and documentary; second, contestant's proof, oral and documentary, if any. In contested applications the commission may permit rebuttal testimony to be offered; each party to have the right of cross-examination, and may be represented by counsel. The commission may permit arguments at the conclusion of such hearing.

SEC. 22. That the said commission shall, within thirty days after the submission of said proof, render a decision in writing, which decision shall be final, unless, for good cause shown by the defeated party, a rehearing is granted.

SEC. 23. That in case a majority of the members of said commission concur in a decision in favor of the petitioner, the said commission shall thereupon make an order directing the methods and specifying in detail the manner in which operations shall proceed in such mine or mines; what restraining or impounding works, if facilities therefor can be found,

shall be built; bow and of what material; where to be located, and in general set forth such further requirements and safeguards as will protect the public interest and prevent injury to the said navigable rivers, with such conditions and limitations as will observe all the provisions of this act in relation to the working thereof.

SEC. 24. That such petitioner or petitioners must within a reasonable time present plans and specifications of all works required to be built in pursuance of said order, for examination, correction and approval by said commission.

SEC. 25. That upon approval thereof work may immediately commence thereon under the supervision of said commission or representative thereof attached to the same from the Engineer Corps of the United States Army, who shall inspect same from time to time. Upon completion thereof the same shall be examined, and if found in every respect to meet the requirements of the said order and said approved plans and specifications, permission shall thereupon be granted to the owner of such mine or mines to commence operations subject to the conditions of said order and the provisions of this act.

SEC. 26. That no permission granted to a mine owner or owners under this act shall take effect, so far as regards the working of a mine, until all restraining or impounding works, if any are prescribed by the order granting such permission, have been completed and until the restraining or impounding works or settling reservoir or basins provided by said commission have reached such a stage as in the opinion of said commission it is safe to use same: *Provided, however*, That if said commission shall be of the opinion that the restraining and other work constructed at the mine or mines shall be sufficient to protect the rivers and work of said commission, then such mine or mines may be permitted to commence operations.

SEC. 27. That in case the joint petition referred to in section eighteen hereof is favorably acted upon, the commission shall fix the respective amounts to be paid by each owner of such mines toward providing and building necessary restraining or impounding works. In the event of a petition being filed after the entry of such order, or in case the impounding dam or dams have already been constructed, and if favorably considered, the commission shall fix such amount as may be reasonable for the privilege of dumping therein, which amount shall be divided between the original owners of such restraining or impounding dams or settling reservoirs, if any are used, in proportion to the amount respectively paid by each party named in the petition.

SEC. 28. That the expense of maintaining and protecting such joint dam shall be divided among mine owners using same in such proportion as the commission shall determine.

SEC. 29. That in all cases where it is practicable, restraining and impounding works are to be provided by mine owners near the mine or mines before reaching the main tributaries of said navigable rivers.

SEC. 30. That at no time shall any more debris be permitted to be washed away from any hydraulic mine or mines situated on the tributaries of said rivers, and the respective branches of each, worked under the provisions of this act, than can be properly cared for at said mine or mines, as per order of said commission, or by the restraining works erected in accordance with the directions of this act by said commission, or which in the aggregate will produce material to be carried in suspension in said rivers in excess of the carrying capacity of the currents therein.

SEC. 31. That the said commission may at any time when the condition of the navigable rivers or when the capacities of all impounding and settling facilities erected by mine owners or provided by Government authority require same, modify any order granting the privilege to mine by the hydraulic mining process, so as to reduce amount thereof to meet the capacities of the facilities then in use; or if actually required in order to protect the navigable rivers from damage, may revoke same until the further notice of the commission.

SEC. 32. That any material violation of the terms and conditions of such order, by any mine owner or owners, shall work a forfeiture of the privileges thereby conferred, and upon notice thereof being served upon such owner or owners, or agent in charge, work shall immediately cease.

SEC. 33. That said commission, or a committee therefrom, or officer of said corps assigned to duty under its orders, shall, whenever deemed necessary, visit all mines operating under the provisions of this act and examine the working thereof and condition of restraining dams and other works. A report of such examination shall be placed on file.

SEC. 34. That the said commission is hereby authorized and empowered to acquire by purchase, if feasible, if not, by condemnation in the proper court of the State of California, under the right of eminent domain in the name of and for the benefit of the United States, all such land, storage site for debris or water, places for construction of dams, settling reservoirs, rights of way for canals, tule and swamp lands, sloughs, and basins necessary in the prosecution and construction of the work contemplated by this act, either for the permanent improvement of said rivers, the protection thereof against the encroachment of and damage from debris resulting from mining operations, natural erosions, or other causes, lodged in said rivers and their tributaries, with their branches or for any purpose declared by this act to be a public use, or for rights of way necessary or incidental to any of the purchases and objects of this act, or for the purpose of procuring any stone, rock, timber, or other material necessary for the erection or construction of any of the works provided for by this act.

SEC. 35. That the use of any and all ravines, water courses, streams, canyons, places, storage sites, sloughs, or basins having their outlet or discharge into either of said navigable rivers, or any of the tributaries thereof, or from either of which the water or material may flow or find its way into either of said navigable rivers, or any of the tributaries thereof, as a place of deposit for any water, earth, sand, gravel, stones, boulders, or other material known as mining debris, resulting from the working of any mine or mines permitted to operate under the provisions of this act, is hereby declared to be a public use, and subject as such to the provisions of the same, and to such laws as now exist or may hereafter be enacted for their purchase, use, or control.

SEC. 36. That the said commission is hereby granted the right to use any of the public lands of the United States, or any rock, stone, timber, trees, brush, or material thereon or therein, for any of the purposes of this act; and the Secretary of the Interior is hereby authorized and requested that, after notice has been filed with the Commissioner of the General Land Office by said commission setting forth what public lands are required by it under the authority of this section, such land or lands shall be withdrawn from sale and entry under the laws of the United States.

SEC. 37. That any person or persons who willfully or maliciously injures, damages, or destroys, or attempts to injure, damage, or destroy, any dam or other work erected under the provisions of this act for restraining, impounding, or settling purposes, or for use in connection therewith, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not to exceed the sum of five thousand dollars, or be imprisoned not to exceed five years, or by both such fine and imprisonment, in the discretion of the court.

SEC. 38. That the Secretary of War shall, when requested by said commission, detail from the Engineer Corps of the Army such officers and men as may be necessary, and shall place in the charge and for the use of said commission such necessary machinery and instruments as may be under his control required for the performance of the duties of said commission. The Secretary of the Treasury shall, when requested by said commission, in like manner detail from the Coast and Geodetic Survey such officers and men as may be necessary, together with such transportation facilities, instruments and machinery, as may be deemed necessary.

SEC. 39. That the said commission may, with the approval of the Secretary of War, employ such additional force and assistants and provide by purchase or otherwise such transportation facilities, on land or rivers, and instruments or other articles necessary in the performance of its work.

SEC. 40. That it shall be the duty of said commission to apply the money appropriated by law for the building of works and improvements contemplated by this act by contract, when the same can be done without detriment to the interests of the Government; if otherwise, then the same shall be constructed by hired labor. When such works are done by contract such contract shall be made after sufficient public advertisement for proposals, in such manner and form and for such time as the commission may prescribe; and such contract shall be made with the lowest responsible bidder, accompanied by such security as the commission may require, conditioned for the faithful performance of the work according to contract and the plans and specifications accompanying same and for the full payment of all liabilities incurred in the construction thereof for labor and material: *Provided further*, That in no case, whether done by contract or hired labor, shall Chinese be employed in such work.

SEC. 41. All work done by mine owners, individuals, or corporate, in the fulfillment of the terms and conditions fixed by said commission in any order permitting hydraulic mines to be worked, shall be done by other than Chinese labor.

SEC. 42. That said commission, in order that such material as is now, or may hereafter, be lodged in the tributaries of the Sacramento and San Joaquin rivers, resulting from mining operations, natural erosion, or other causes may be prevented from injuring the said navigable rivers or such of the tributaries of either as may be navigable, is hereby directed and empowered to proceed without delay to build at such points above the head of navigation in said rivers, or either of their tributaries, as herein-after indicated, or at any point calculated, in the judgment of said commission, to effect said object, the same to be of such material as will insure safety and permanency, or, as indicated herein, such restraining or impounding dams and settling reservoirs, with such canals, locks, or other works adapted and required to complete same, as per recommendations contained in Executive Document Numbered Two hundred and sixty-seven, Fifty-first Congress, second session, and Executive Document Numbered ninety-eight, Forty-seventh Congress, first session. And for such purposes the following sums are hereby appropriated, from moneys in the Treasury not otherwise appropriated, to be immediately available, for the building and construction thereof and the acquirement of sites therefor when necessary so to do, at or near the places named in connection with each sum, respectively, namely:

For the erection of a stone dam at Rattlesnake Bar, on the American River, two hundred thousand dollars.

For the erection of a stone dam at Van Giesens, on Bear River, one hundred and fifty thousand dollars.

For the erection of a stone dam at De Guerre Point, on Yuba River, three hundred thousand dollars.

For restriction works on Yuba River below foot-hills, three hundred thousand dollars.

For the erection of a stone dam on the main Yuba River, at a point near the mouth of Deer Creek, known as the Narrows, three hundred thousand dollars.

For the erection at such place or places on Feather River as the commission may select, such dam, or dams, or other restraining works as said commission may deem necessary, one hundred and fifty thousand dollars.

For the construction and completion at such place or places as the commission may deem proper, of any settling reservoir, or basins for debris, or water, with necessary canals and locks, or such other restraining works as may be necessary, one hundred and fifty thousand dollars.

For the erection of dams or other restraining works as the commission may deem necessary on the tributaries of the Sacramento River in the vicinity of Redding, thirty thousand dollars.

For the erection of a dam at such place on the Consumnes River as the commission may select, forty thousand dollars.

For the erection of a stone dam on Sutter Creek, above Ione City, twenty thousand dollars.

For the erection of a dam or dams, near or above Jenny Lind, on the Calaveras River, thirty thousand dollars.

SEC. 43. That a further appropriation of the sum of fifty thousand dollars is hereby made, out of any money in the Treasury not otherwise appropriated, to be immediately available, to defray the expenses and for other uses of said commission in carrying out the objects of this act.

The Closing of the Blue Bird Mine.

On the death of Ferdinand Van Zant, President of the Blue Bird mine, Butte, Mootana, the mine was attached. The low price of silver has made it hard pulling for the silver-producing mines of Butte, and it appears that the Blue Bird was temporarily embarrassed. It owed something like \$40,000, mainly to the banking house of Hoge, Brownlee & Co. To raise this and other sums was Mr. Van Zant's mission to Europe. When the notes fell due, the bank attached the mine. The cablegram announcing this fact proved Van Zant's death warrant.

The men at the mine were all paid off on the 1st inst. The effect of the enforced idleness on the people of Burlington and Rucker will be very depressing. The Butte *Inter-Mountain* says:

There was quite a gathering of miners around the hoisting works yesterday watching the cages make their last trips in the shaft, hoisting the pumps out. The pumps now lie on the ground and the water is beginning to rise. The column pipes, however, were allowed to remain in the shaft.

The employees of the company were sorely grieved at the news of the death of their much loved employer, and every miner at the Blue Bird would gladly have given up his month's salary and worked several months for their board, if they thought he needed it, or if he had requested it. Many little friendly acts of Mr. Van Zant were recalled around the hoist by groups of miners who were discussing the situation. They recalled how he often mingled with them in the "dry," or at lunch hour, and chatted pleasantly, and how he frequently gave a helping hand if a car got off the track. They also recalled the many kindnesses shown by Mrs. Van Zant, who was greatly respected by the Blue Bird employees. None more than these miners and millmen regret more sincerely the crowning calamity that has befallen the Blue Bird Company, for they feel, with Mr. Van Zant gone, the Blue Bird Company dies with him.

The great property had been gradually losing strength for months, and week by week the noise of industry from the great mill grew weaker, until near the end only ten stamps were dropping. It transpires also that for a long time past the mill was working ore from the dump—second-class ore that was considered valueless while the great vein was productive. A little ore was occasionally taken out of the mine and worked with the ore from the waste dump.

It is now stated that had the company been granted 30 days more time, it would have pulled through all right. This statement is attributed to the mine foreman, who is quoted as saying that just about the time the climax came, good ore was struck in the east and west drifts of the 600-foot level—the deepest workings. It was the intention a short time ago to sink a new shaft at some point between the hoist and mill, but later it was decided to open up a winze from the 600 foot level, on an incline, to the depth of 1000 feet. This work it was fully expected would develop the continuance of the rich ore bodies below, but it was never carried out.

What the future will bring cannot be told at this time, although confidence is expressed that some of the other claims will be prospected. A new shaft was lately started on the Poormao, adjoining the Blue Bird, and the indications were very encouraging for the continuance of the explorations.

More Local Cable Roads.

The McAllister-street cable cars began running over the extension along the north side of the Park on the 9th inst. The new extension is along Fulton street from the old terminus at the top of the hill, seven blocks to Seventh avenue, and stops at the Park terminus of the Powell-street line.

J. L. Wilcutt, Secretary of the Market-street Cable Co., states that 25 men are at work breaking ground near the Park for the Park extension of the Geary-street cable line, which will do away with the steam dummies on that road. The new line will run over Fifth avenue from Point Lobos avenue to the Park, instead of over Third avenue. Construction will be rapidly pushed and the cable cars will be run to the Park when the extension is completed and the road reconstructed from the present terminus to the power house at Buchanan street. The entire present cable road is to be torn out and reconstructed without stopping travel on the line. The gauge is to be changed from 5 feet to 4 feet 8½ inches, to conform with the gauge of the Market-street lines.

Work will soon be resumed on the Page-street line, which was completed some time ago from First avenue on Frederick street,

on the south side of the Park, along Frederick street to Masonic avenue, thence to Page street, and along Page street as far as Baker street. The line will be completed along Page to Market, and crossing Market street will connect with the Market-street power house by way of Potter street.

The completion of the long-talked-of Mission-street cable line is promised for this year. The question of the grade at Army street is to be settled shortly, and the matter of the widening of Mission street has progressed so far that an opportunity for beginning operations has arrived. The rails have been ordered, and many of them are here. The work of putting in the roadbed is to begin within two or three months. All this activity on the part of the Market-street Cable Co. has been forced and hastened by the pushing competition of rival companies.

World's Fair Notes.

An Ohio World's Fair commissioner has estimated that the exhibitors from his State will spend upward of \$5,000,000 in the preparation of their exhibits for the Exposition.

Denmark will spend about \$500 in showing, as a leading feature of its World's Fair exhibit, a Danish dairy, complete and in operation. The dairy interest is one of the most important in Denmark, and the most approved methods and mechanical appliances are utilized in the dairies of that country.

Special World's Fair Commissioner Alexander Campbell has returned from Australasia, and reports that great enthusiasm over the Exposition is felt in that part of the world. New South Wales, South Australia, Victoria, Queensland, New Zealand, Tasmania, are all making extensive preparations for their representation, and splendid exhibits are reported sure to be sent.

The Governments of Norway and Sweden have, respectively, asked for World's Fair appropriations of \$61,288 and \$53,600. In Norway a number of private citizens are raising a fund of \$10,720 with which to build and send to Chicago a counterpart of the Viking ship which was exhumed near Sandefjord, a few years ago.

W. L. Libby & Sons of Toledo intend to erect, on Midway Plaisance, a factory in which the manufacture of cut glass can be seen, from the furnace, on through the cutting, finishing and decorating departments, until the finished product is turned out. The factory plans call for a structure 125x200 feet, of stone, iron and glass, and with imposing dome. The firm intends to spend \$40,000 on the building alone.

Suironow & Co. of St. Petersburg, Russia, will exhibit a complete suite of apartments of a "Boyar," or wealthy Russian noble of the XII century, and also the cabin of the rich Russian peasant of modern times. Each of these exhibits will be in a separate pavilion of distinctively Russian architecture. The great samovar factory of Toula, Russia, will send to the Exposition a large exhibit of its products. It will also erect a great teahouse that will be a great reproduction of the most luxurious of these establishments to be found in the great cities of Russia in the early part of this century.

Remenyi, the well-known violin virtuoso, has made application for a space of not less than 400 square feet in which to exhibit his great collection of rare African ethnological specimens. The selection, which comprises over 1500 carefully selected specimens, has been formed during the last forty years, and is beyond question the most perfect of its kind. It is especially rich in the ancient regal symbols in use among the Zulus, including sceptres, royal bracelets, which were used instead of crowns, and other emblems of hammered silver, of carved and polished ivory, and of rhinoceros' horn. The royal bracelets are especially interesting. They are hollowed rings made from transverse sections of huge elephant tusks and, until his death, were never taken off, after once placed on the arm of the king. There are also several splendid specimens of the exceedingly rare and beautiful royal silk mantles of the sovereigns of Madagascar, three hundred and more years ago. These mantles are curiously adorned with broderies of metal and of uncut precious stones and of feather work. Every specimen in the collection is perfect and unique of its kind.

Inquiry made by a Brooklyn, N. Y., firm of the Treasury Department regarding machinery imported for exhibit at the Chicago Exposition elicited a prompt response from Acting Secretary Spaulding. He held that machinery brought over to the United States for the purpose of illustrating a certain manufacturing process at the Exposition would be admitted free of duty. Raw material, however, imported for use in such a manufacturing process, would be subject to duty under all circumstances.

Copper Product of 1891.

The Calumet & Hecla Mining Co. has still neglected to furnish us with the official statement of its production of copper in 1891, but we have good reason for estimating it at 56,000,000 pounds instead of 65,000,000 pounds, which was the figure that we quoted it at in our annual statistical number. The error was through a transposition of the figures which was confirmed by the known output of mineral of the company during the year. Had this mineral averaged 70 per cent, which is lower than its average in former years, it would have made 65,000,000 pounds; but as a matter of fact, the Calumet & Hecla mineral is now running very much lower than it ever did before. This change in the production of this company will make a corresponding change in the output of the Lake Superior mines, which will be 104,370,000 pounds, or 46,594 tons of 2240 pounds, instead of 115,370,000 pounds, or 51,505 tons of 2240 pounds, and the total production of the United States 287,620,000 pounds, or 128,402 tons of 2240 pounds. Adding to this the stocks on hand January 1, 1891, which amounted to 101,000,000 pounds, or 45,089 tons of 2240 pounds, and the imports of copper in pigs, bars, etc., which according to revised figures amounted to 3,060,000 pounds, or 1367 tons of 2240 pounds, the total available supply was 391,680,000 pounds, or 174,858 tons of 2240 pounds. Deducting from this the exports of copper during the year, which were 114,800,000 pounds, or 51,250 tons of 2240 pounds, and the stocks on hand December 31, 1891, which were reported to us as 76,000,000 pounds, or 33,929 tons of 2240 pounds, the consumption of copper in the United States during 1891 was 200,880,000 pounds, or 89,679 tons of 2240 pounds, which was an increase of 11,596,000 pounds over 1890.

We have received additional reports of the output of some of the principal copper mines of other countries. The product of the Cape Copper Co. for 11 months was 4500 tons of 2240 pounds. The product of the following mines is for the 12 months of the year in tons of 2240 pounds: Mansfeld, Germany, 14,395; Boleo, Mexico, 4036; Newfoundland (Little Bay), 700; Quebrada, Venezuela, 6716; Mason & Barry, Portugal, 4150; and Seville, Spain, 960.—Engineering and Mining Journal.

Proposed Mining Tax in Mexico.

A plan of taxation on mines has been submitted to President Diaz, which in substance is as follows, according to the *Financier*:

I. A Registry Office, in which all titles to mines will have to be inscribed, is to be opened in the Department of Finance.

II. Titles will be issued by that office subject to a stamp tax of \$100 each.

III. From and after July 1st next, mines will be subject to an annual tax of \$300 each, payable either in triennial, monthly or weekly installments.

IV. The nation to guarantee to the operators of mines, as long as they pay the aforementioned taxes, an absolute right to their mines, whether they be in operation or not.

The *Financier* remarks that a Federal tax on mines, however light, may appear to be peculiarly ill-timed in the present depressed condition of the silver market. On the other hand, it should be noted that the outlined project secures a substantial equivalent to mine owners by freeing them from the harassing fear of denunciations and of expensive and vexatious litigation. At the present moment, mines in which operations are suspended for a given length of time (see Art. 50 of the Mining Code) are liable to denouncement, no matter how heavy the expenditure of the dispossessed parties may have been, and though their inactivity be due to circumstances totally beyond their control. Naturally, this legislation has often been felt as a considerable hardship. It is true that the law provides the resource of "amparo," a proceeding by which possessors of mines are secured from denouncement; but the "amparo" is, after all, an inadequate form of protection, not only because it is granted under restrictions and for a limited time, but because in many cases it is not obtainable without expenses and delays. It is, then, not unreasonably maintained by the framer of the new plan that the proposed tax would be a boon instead of a burden to many miners, affording them, as it would, a species of protection far more valuable and ample than the amparo, at probably less cost and with greater simplicity, promptitude and certainty. It is estimated that there are at present in operation in different parts of the country 8000 mines.

GOLD, DIAMONDS AND RUBIES.—The Placerville *Democrat* says: The Tockey

mine, better known as the old Franklin gravel mine, on Texas Hill, has again come into prominence, not as a producer of bullion as is usually the case, but as a yielder of precious stones. One day last week while panning for gold, the owners discovered among the tailings a shining substance, which upon examination proved to be a diamond. It was brought to town and was pronounced by all our jewelers to be a first-water diamond. The mine also yields rubies.

A Copper Combine.

Associated Press dispatches dated New York, March 10th, are to the following effect: Rumors of a great combination, which, if effected, will involve millions of dollars, is just now proving a matter of prime interest to manufacturers and dealers in copper and holders of copper mining stocks.

For months copper prices have been very low and the tension upon most of the copper-mining companies in the Lake Superior region, Montana, Arizona and New Mexico to keep things going has been severe. It has been urged by copper men that some combination to limit the production should be forced, but only within a very recent time has the matter assumed shape. Negotiations have been carried on very secretly. The course of prices, however, in the Boston market has shown things to have been going on favorably.

A Boston dispatch received this afternoon says: "The statement is made here on good authority that the proposed combination of copper mine properties, with the exception of the Quincy Company, which declined to join, has practically been effected. It is stated that the annual production of the Anaconda mine has been fixed at 70,000,000 pounds, and that of the Calumet and Hecla at 60,000,000."

J. B. Haggin denied to-night that it was the Anaconda's intention to add any Western mines to its plant. He declined to say anything about the effort of producers to fix a uniform price on the limit of production.

"The trust would have been brought about and a uniform price fixed by the largest producers if a certain big company did not desire to get control of all the copper mines in the West," said a man who knows all about the conferences which have been held between the copper men. "There are big mines in Arizona and New Mexico, as well as in Montana, and if one company were in control of these, it would be in a better position than at present to fix the prices to suit itself. Mining companies in Arizona and New Mexico are not making much money at present, and are perfectly willing to enter into agreement with the Anaconda Company of Montana and the Calumet and Hecla Company of Michigan, but are not willing to sell the controlling interest in their property to any other company, and as the Anaconda Company wants to get hold of these companies it promises to oppose any measure that will place these mines in an independent position, and it is to the Anaconda's interest to keep the price of copper down at present, so that the Arizona and New Mexico companies can more easily be brought to terms, and for that reason the Anaconda will not at present consent to sell copper at any fixed price."

Another dispatch from Boston, dated March 11th, says: A Boston man, representing important copper-mining interests both in Michigan and Montana, tells the *Transcript* that practically all that can be done is to make some such arrangement as that of the famous Interstate Railroad Association, generally known as "The Gentlemen's Agreement." If the copper producers of the country are convinced that the way to meet the present low and unprofitable state of the market for copper is by restricting production, and if they find the laws of Michigan or of the United States are against a combination as such, there is nothing left but a verbal agreement, based upon the honor of the gentlemen concerned. How such an arrangement would work is doubtful. Unless something is done, however, there will not be more than half a dozen mines in the whole country which can return dividends to stockholders. Producers generally understand this, but it is quite natural that the larger companies should not be so much concerned as the smaller ones.

A Wall-street journal says an agreement for the betterment of prices has been about perfected. From the corporations interested the following figures, which the respective companies agree to adhere to in the way of production during 1892, have been obtained: For Anaconda, 75,000,000 pounds; Calumet and Hecla, 60,000,000; Quincy, 12,000,000; Parrott, 14,000,000.

The allotments given in the figures quoted indicate a larger output than that of last year.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, March 12: I am happy to state that the mines hereabouts, after a short period of depression, are again on the improve. Drifting at the 900-foot level of the Wildman is finished, and they have almost cut through the ledge. They had explored the vein only a few feet when excellent rock was struck, showing free gold. As soon as they have reached the footwall, drifting on the ledge will be in order. Twenty stamps of the mill are hung up, to give them an opportunity to do some needed repairs in the shaft. The other 10 stamps are kept running on ore from the bottom level. At the South Eureka, Supt. Parks states the indications continue to improve as they go down. They are now down close on to 500 feet, and the formation is becoming softer. Although this is considered a good sign in many respects, it is objectionable to some extent on account of the greater pressure upon the timbers in the shaft. Surface work is still in progress at the Hector. Three or four men are running a tunnel, which furnishes a little ore, but the greater portion of milling material is taken from an old dump, and so easily ruined that but few men are required. Mr. Valentine has gone to San Francisco on business pertaining to the mine, and on his return it is reported that taking the water out of the shaft will be vigorously entered upon. The Lincoln is running on a small scale, but from all reports it is barely paying expenses. The Belmont is running on a limited scale also.

SOUTH SPRING HILL.—Amador Ledger, March 12: We are pleased to be able to state that this mine is again forging to the front as a hullion producer. At the 800-foot level running south, the vein shows 66 feet wide, over 40 feet of which is good milling ore. The outlook for a prosperous future is very bright. The great drawback to the proper development of this claim is the want of another shaft. There is only one shaft, and the mine has developed far away to the south of it, so that ore has to run 1200 feet underground before it can be hoisted. All this consumes time, and time means expenditure of money. The owners will no doubt, with the improvement of the mine, take immediate steps to the sinking of a new shaft.

AMADOR GOLD MINE.—Last Tuesday was the day set for the trial of J. P. Darling and other lien holders vs. Amador Gold Mine. The attorneys on both sides were on hand, and the court room was well filled with the numerous creditors, who were rejoiced at the prospect of a speedy termination of this long-standing suit. At the last moment, however, a new feature was injected into the case by another foreclosure suit of Jas. E. Dye, who has been in charge of the property in the interest of the English stockholders. The judge held that it was his duty to consolidate all lien suits, and ordered the last one consolidated with the others, and continued the trial until April 6th. There was a great deal of dissatisfaction felt at this delay, many believing that the suit was started simply for delay. It was reported that an agreement had been arrived at between the English and American stockholders for the settlement of all pending litigation, and by the terms of which the mine would pass into the hands of the American shareholders. This agreement, however, has not been definitely concluded yet, and it is by no means certain whether it will be carried out.

BAY STATE.—It is the intention of the directors of the Bay State company to commence prospecting for the ledge at the depth of 300 feet. The shaft is now down about 250 feet, and in two months it is expected that drifting will be inaugurated.

El Dorado.

ASBESTOS MINE.—Placer Republican, March 12: One of the most important items of interest during the week was the location of an asbestos mine in El Dorado county. The mine has been located by M. T. Lawrence, J. H. Richie, Daniel Kirby and William Houchin, of Auburn. It consists of a fine seven-foot ledge of a good quality of this mineral. The mine is located 16 miles from Auburn, a mile and a half from the American river, and about four miles from Greenwood. The fiber is used in the manufacture of fireproof roofing, and can be made into gloves or cloth which are incombustible; it is also used in the manufacture of iron safes and lampwicks. The writer has seen a sample of the mineral, which is very fibrous and of a gray color. Our townsmen have evidently struck a good thing.

Nevada.

CALIFORNIA SPECIMENS.—Grass Valley Telegraph, March 12: To-day at noon a Telegraph reporter was shown most handsome specimens of ore, literally filled with gold, taken from the California mine Friday afternoon. In fact, they surpass the magnificent ore taken from the California last summer and over which so much excitement was raised at that time. And the beauty of it all is the fact that there is every indication of the ledge being a permanent one, as it is in a settled country, at a depth of 200 feet from surface, that being the deepest prospecting ever done in the celebrated Deadman's Flat district. The specimens were taken from the hanging wall in the slope of the south drift, which has been traced for a distance of 80 feet and no signs are shown of its "petering out." The footwall ledge, while it does not contain so much gold, contains galena, black jack and other minerals, giving it a lively appearance. In the next level below, where work is actively going on, it is expected the hanging

and footwall ledges will come together, and then all the stockholders expect to become as rich as Croesus, for they believe they will then be in the famous McCook ground. Ore from the footwall ledge pays an average of \$20 per ton, and the mill is kept busy at work crushing the ore. There is every evidence that the California will soon be reckoned as one of our dividenders.

RICH ORE FROM THE CALIFORNIA.—Grass Valley Union, March 13: On Friday some very rich quartz was taken out of the south stope of the California mine, above the 200-foot level. No specimen rock has ever before been taken out of this portion of the mine, and it shows the existence of a pay shoot dipping south on the vein, which is the theory upon which the mine is being worked. The quartz taken out had streaks of heavy gold running through it, and mixed with galena and fine looking sulphurets. The quartz was also solid and of excellent appearance. There is no doubt felt but this pay shoot is going deeper, and will be struck in the 300 level, which is now being driven south. The find is in every way encouraging, and gives reason for the stockholders to believe that the mine is soon to be a reliable hullion producer. No quartz of equal value has ever before been taken from the mine.

Mono.

THE BULWER CON.—Bodie Miner, March 11: Nine hundred tons of ore have been crushed that yielded \$38,000. They have considerable more high grade ore on hand, which for the present will have to remain in the mine, on account of the Bodie Company requiring the mill to make a run of their own ore.

STANDARD.—The "Old Reliable" is turning out about \$20,000 every month, and under the able and efficient management of Supt. Leggett it will keep on doing so for years. It is reported on the street that a ledge of very rich ore has been struck lately in this mine.

SUMMIT.—About 100 tons of ore are on the dump and will soon be run through the Bodie mill. If satisfactory results be obtained, and there is every reason to believe that they will, arrangements will be made to run the mine on a larger scale.

SYNDICATE.—A large force of men is at work getting out ore of good quality. This has been a good mine and will continue to be so for some time to come.

Placer.

THE SWEET AND THE BITTER.—Grass Valley Union, March 13: If the coming Eastern editors are taken to Dutch Flat to see the mode of hydraulic mining for the extraction of gold, the Sutter Farmer suggests that they should also be shown the effects of such mining in filling the rivers with debris. There could be no objection to this. Let the editors understand the whole matter. The miners have no disguises to make, and are willing to admit that the debris has inflicted injury, but not to the extent claimed.

HARLOW.—Placer Argus, March 11: Secretary Everett paid a visit on Wednesday to the Harlow mine, three miles south of Loomis, and reports excellent results from the work being done there. The Harlow is a drift gravel mine, and some of the gravel absolutely cleans up \$1 in gold to the pound. They are working 20 men.

Plumas.

CLAYBANK.—Plumas National, March 12: The tunnel at Claybank mine, near La Porte, is being pushed ahead as fast as possible. The tunnel is now in over one mile. Very flattering reports come from the Thistle shaft. Owing to the recent rains, this company has been enabled to wash its dump pile. Gus Kuriz went up to his claim on the head of Rock creek, Tuesday. This is a placer claim. Last year, Gus took out several hundred dollars. He expects to do better this season. Bennett & Bell, who have part of the Leavitt drift mine leased, are in 100 feet with their tunnel and have good pay gravel. In former years this mine was immensely rich. Supervisor Nevill informs us that at the Little Jamison mine they struck it rich last Saturday. The tunnel is in between 1300 and 1400 feet, and the ledge has widened out considerably and prospects rich. They have between 75 and 80 feet of backs and are working some 23 men. Frank Thomas informs us that in starting a tunnel on the opposite side of the hill from the old Bell G. M. Co.'s tunnel, and when in only six feet, he struck a ledge three or four feet wide that shows free gold all through it and prospects rich. We heard, Friday, that Thompson & Kellogg had struck it rich in their tunnel at the Butterly ledge, this week. Charley Schneider came down from Meadow Valley, Friday. He was over on the East Branch a short time ago, and reports the boys all doing well. He says that at the Rush Creek Flat mine, owned by W. E. Duncan of Oroville, Henry Patten Supt., \$75 was taken out of three pans of gravel that was found while drifting. C. E. McLaughlin and Jake Stephan have leased the Golden Gate quartz mine from the owners for two years.

MINE LEASED.—Plumas Co. Bulletin, March 11: On Tuesday, C. E. McLaughlin and Jake Stephan leased the Golden Gate quartz mine from the owners, and are now making preparations to actively engage in working the property. It is their intention to erect, as soon as possible, a 10-stamp quartz mill which will enable them to work the mine on a much larger scale than heretofore. The mine, commonly known as the Jackson ledge, is situated about eight miles from Quincy, on the ridge north of Snake lake, and consists of two locations, thus giving 3000 feet of ground on the course of the vein. Last fall, a company did some development work and erected a 5-stamp mill which was operated at a great disadvantage, yet the ore yielded a goodly sum per ton. With the increased facilities which the lessees will have for working, we expect this property to become an important factor in the prosperity of this community. One of the owners says there are

now 3000 tons of ore in sight, and that over 1000 feet of the vein has been prospected, showing pay ore all along the ledge. The mine is so located that the ore is easy of extraction, and notwithstanding that it must be hauled about one-half of a mile, it can be mined and milled at a very reasonable figure, one that is sure to yield a good profit.

Sierra.

SIERRA CITY.—Mountain Messenger, March 12: The Rising Sun mining claim, a quarter of a mile below Sierra City, contains a good pay channel, 500 feet wide, 1200 feet long and an area of 38 acres. Three shafts were sunk from the bottom of the tunnel, in the channel, gravel prospecting \$1.50 to the pan. If this mine was thoroughly handled, it would be a good and permanent support to our town. The claim is owned by Samuel and Richard Uren and Antone Lewis. A half ounce nugget, from a foot square of the lead, was valued at \$9. Butte Saddle Co. have struck the second pay chute, for which they have been running and rock prospects well. Ledge is two and a half feet wide, and widening more. Distance from first to second chute, 500 feet.

Trinity.

CANON CREEK.—Trinity Journal, March 12: On our trip to Dedrick the first of this week we found work progressing slowly on most of the mines. The "Chloride" Company is running a tunnel through very hard rock to tap their ledge on the third level. They have got in 145 feet, having about 70 feet yet to run. The "Maple" Co. have tapped their ledge and are now running on it toward the shaft. When they get to a point under the old shaft they will raise up to get air. The ledge is looking very well, but an amount of work sufficient to determine the value of the mine has not yet been done.

Tuolumne.

WORK STOPPED.—Union Democrat, March 12: Operations on the Platt and Gilson mine, near Soulsbyville, have ceased, and it is very certain that work on the mine will not be resumed. The gentlemen owning the Platt and Gilson have purchased the Gerry-mander mine, situated near the Golden Gate, which they will have thoroughly prospected. It is to be hoped that this company will realize largely, for they have sunk \$120,000 in the Platt and Gilson mine, and still have abundant faith in the mineral wealth of this county. Messrs. Conlin & Graham will soon start up their mill on the Hilton & McPherson mine, near Saw Mill Flat. Lee R. McPherson has a force of miners at work, night and day, on his rich channel diggings recently opened up on the Vise Spring Ranch. Dave Levy, who is a heavy stockholder in Old Tuolumne mine, paid that property a visit of inspection, and reports himself as much pleased with the progress made by Supt. Davis. The tunnel is now in 1200 feet and they expect to strike the pay chute within the next four months. They will then have stopping ground on good rock for years, and which will amply compensate them for the large outlay they have made in development work.

NEVADA.

Washoe District.

CON. CALIFORNIA & VIRGINIA.—1500 level—Our work on this level during the week has been confined to prospecting. 1600 level—Are continuing the work of prospecting upward from the old sill floor. 1650 level—Have continued to extract ore of fair quality from the drift run west from the top of the upraise carried up 59 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from winze No. 3, 73 feet down, in working upward from that point. 1750 level—In working out and upward from the bottom of winze No. 2, sunk from the 1650 level, we continue to extract ore of fair quality. There has been extracted from all parts of the mine during the week 977 650-2000 tons of ore, which were shipped to the Morgan mill. The average assay value of all the ore worked at that mill during the week (980 tons) was \$19.43 per ton. Bullion now on hand in our assay office, assay value about \$13,500.

OPHIR.—1465 level—The north drift started from the drift run west from the winze, 122 feet below the sill floor of the 1300 level, 80 feet west from the winze, has been advanced 4 feet; total length, 122 feet. From this drift, at a point 73 feet in from its mouth, an east crosscut has been advanced 11 feet; in porphyry and quartz of low assay value.

MEXICAN.—On the 1465 level the crosscut running east from the bottom of the winze sunk 101 feet down from the end of the crosscut run west 132 feet in from the main north lateral drift near the south boundary line of the mine, has been advanced 18 feet; face in very hard porphyry formation.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. west drift from the shaft has been extended 21 feet; total distance west from the shaft, 1740 feet. The face is in porphyry and streaks of quartz.

GOULD & CURRY.—200 level—Northwest drift, 435 feet west of shaft, has been extended 22 feet; total, 92 feet; face in porphyry. On the Suro tunnel level the joint north drift with the Savage Co. was advanced 21 feet; total length, 235 feet; face in soft porphyry.

BEST & BELCHER.—900 level—All work in west crosscut No. 1 for the week has been on repairs. Started an east crosscut from opposite west crosscut, and advanced same through porphyry, clay and stringers of quartz.

Osceola District.

WATER SUPPLY.—White Pine News, March 12: From a private letter received by a party here a few days ago, we learn that the Osceola Gravel M. Co. has just closed the purchase of W. T. Gregory, George Robinson and Robert Wilson's water rights, paying Gregory \$5000, Robinson \$3000 and Wilson \$3000 for his ranch and water right. This water is to supply in part the new

ditch the company made two years ago. The new ditch was made too high up the mountain to catch the water which runs in Lehman creek, hence the purchase.

Montgomery District.

A MILL.—Walker Lake Bulletin, March 12: It is said that negotiations have been in progress in San Francisco for some time past between George Montgomery, of "Breyfogle" fame, and George Crocker, for the purchase of the 40-stamp quartz mill of the State Line Mining Company located at Gold Mountain, in this county. If the sale is consummated, the mill will be removed to Montgomery, Nye county.

ARIZONA.

CASA GRANDE.—Phoenix Herald, March 12: Mr. Kellner met Mr. Thomas Phebe at Casa Grande by special appointment, on business connected with the Silver King mine. Mr. Phebe, a heavy mine owner of New Mexico, has bought a controlling interest in the mine and will move the mill up to the mine from the canal, and the mine will be worked with a good force. The mine will be worked from the upper level, as that has developed ore in better paying quantities than the lower one.

DOS CABEZAS.—Tombstone Epitaph, March 13: The Cooper mill debts have mostly been paid, and the soft-soled miners hired by the year have been turned adrift. Some of our local miners are now employed. The mill, it is expected, will soon be in operation. The old Rouse lode, which had considerable work done on it last summer, is idle at present. Mr. Lodge, who bought the Fowler and McGregor mill a year ago, has not returned from California yet. It is said he will move that mill to a point near the claim.

ANOTHER MILL COMING.—The cannon-ball mill, once at Buckhorn basin in the Chiricahua mountains, and which, later on, was taken to New Mexico by Judge Baker, is coming back to this district. A Colorado capitalist, connected in some way with the Cooper outfit, proposes to set it up on the northern slope of our mountains, which he regards as mere hills compared to the elevations he has been used to.

COLORADO.

CREEDE CAMP.—Associated Press dispatches, dated Creede, March 13th, are as follows: Any number of minor sales of mining interests from sums ranging from \$1000 to \$65,000 have been closed in the last few days, and still capital comes into the camp from all portions of the country. N. C. Creede has refused an offer of \$1,000,000 for his third interest in the Amethyst, on which, three months ago, he gave an option for \$75,000. Miners now here are arranging to put down diamond drills in five or six localities, and this will show up the mineral deposit. The snow is fast disappearing, making intelligent prospecting possible, and where a few weeks ago one man was on the hills, to-day there are 20. Ten-foot holes are by far in the majority in the camp, and until they go deeper, many will question the presence of much mineral outside of the producing veins. Ore shipments have fallen off slightly during the past week, while the Last Chance heaps up its daily output of about 90 tons. The Moses has not been up to its usual capacity because of the management turning its attention to development work and to getting in shape for stopping. The condition of the Burro trail from the Amethyst has been such that the output has not been so great, but this will all be made up when the tramway is built and the daily shipment increased to ten cars. The mining outlook is in a more healthy condition than ever before since the rush began. All agree that it is fast settling down and turning its attention to the hills and wealth which drew them here.

IDAHO.

DR. LAMAR.—Nugget, March 12: The hullion shipped from the De Lamar mine during the week consisted of six bars, valued at \$13,200. It is as regular as death and taxes. The west winze of the Stoddard mine is now down 100 feet, and a station is being cut out for the purpose of crosscutting the ledge. Where crosscut above, the vein was over 40 feet wide. On account of extremely bad air, the men working in the Garfield crosscut tunnel refused to work longer and were paid off this week. The tunnel is about 1100 feet in length, with no ventilation, and a delay will necessarily be made in driving the same, pending preparations for furnishing air, which it is hoped and believed will soon be completed. The strike made several days ago in the Belfast crosscut tunnel of the Phillips and Sullivan mine has turned out to be of more importance than at first reported. This tunnel cuts the vein much deeper than any former workings, and while the ore at this point is similar in character to the ore which has been taken out above, the ledge is 18 feet wide, four feet of it showing a high grade of free gold ore. On the hanging wall there is an iron clay streak 18 inches wide, and then over 12 feet of quartz which samples \$50 per ton in gold and a small amount in silver.

MONTANA.

BLUE BIRD.—Although the mine has been closed by attachment, in the opinion of many, the mill at least will be started up again in the near future under a new ownership. As to the mine, those in a position to know claim that the free-milling ore is exhausted and that nothing remains save base material, that can be successfully treated only by smelting. Of this fact, Ferdinand Van Zandt, the general manager, was aware, and with a view to overcoming the difficulty he organized the Butte Copper Company a short time ago, his intention being to acquire copper properties, erect a smelter and treat the base ore of the Blue Bird

along with the product of the copper ores. Among other copper interests secured, was a portion of the Ground Squirrel, located in the Kemper addition, and the J. T. C., which adjoins the Ground Squirrel on the west. The Squirrel blossomed out as one of the largest producers in the district, and the company had concluded to lift the bond it held upon it. A payment of \$50,000 was due on the first of the month, but instead of making the payment the interest was turned over to Marcus Daly of the Anaconda, who settled the indebtedness and took charge of the property. Like the Blue Bird, the Butte Copper Company, on which Van Zandt placed great hopes to retrieve the deficiencies of the former corporation, has collapsed, and, like the man who organized it and would have made it a success, will rise no more, as the properties from which it expected a supply of ore have already passed into the hands of other corporations.

THE MOUTON.—At 4 o'clock Saturday afternoon, the 20 stamps hung up at the Moulton mill about 10 days ago, on account of a scarcity of custom ore, were unlatched and began dropping on custom ore, a good supply of which has been secured by the company. The mill and mine are now in full blast.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City *Enterprise*, March 11: The Key mill has been running for some time past on ore assorted from the old dumps of the Key mine. Hon. W. S. George has been engaged by the Maud S Company to make a thorough analytical test of the company's ores. The Key mill was sold Tuesday last under Sheriff's sale, and was purchased by one of the attaching creditors, Richard Boyle, for \$3,000. Tom Foster will start up the mill at Gold Hill, on ore from the Reservation, about the first of April, when several fine gold bricks will be turned out. Adam Clark, one of the old time prospectors of this section, is in the city. Adam is very sanguine of the mining future of this section, and thinks the people would be greatly surprised if they knew of a number of mining enterprises now being worked here. Nat Bell of the firm of Bell & Stephens, Pinos Altos, brought in yesterday 112 ounces of gold retort from 70 tons 800 pounds Pacific ore, milled by them during the week. Last week they produced 120 ounces gold from 70 tons Golden Rule ore. They never fail to add their quota to the bullion output of the county. Col. Dickson of Chicago, who is operating the St. Helene mine at Central, was interviewed yesterday by an *Enterprise* reporter, and kindly gave the following information in regard to the working of the property. The deepest working is by a shaft 110 feet; another shaft has attained a depth of 90 feet. The ore body averages 22 inches in width, and the average value \$22 per ton. A mill run of 50 tons is being made by the Grant County Mining and Milling Company, which will demonstrate how closely it may be milled by the free milling copper plate amalgamating process. Operations have been temporarily suspended on the mine, as the Colonel is adverse to throwing away profits on freight for hauling the ore ten miles, when all the natural facilities for milling are in the immediate vicinity of the mine. It is probable a mill will be built before operations are resumed on the mine, as a plentiful supply of ore for a mill has been developed.

OREGON.

THE MONUMENTAL.—Bedrock *Democrat*, March 12: Mr. A. W. Tabor of Granite, who was in the city yesterday, when asked by a *Democrat* reporter for some news regarding the mines of his section, referred to the Monumental mine now being operated by Mr. Chas. Miller, who, it may be said, has had unbounded faith in the wealth of the property in face of adversity, and now, after many years of litigation and other complications, he is in a fair way to see his long deferred hopes realized. Mr. Tabor says that in the 1200-foot tunnel constructed during the time the mine was under the control of the English company a ledge was crosscut, and recently Mr. Miller has run both ways on it and it has developed into a ten-inch vein of exceedingly high grade ore, and it is thought to be a stringer to the main ledge. The ore being taken out in the prosecution of the work to reach the mother lode is being delivered at the Monumental mill and its reduction will soon be made.

UTAH.

TO DRY AND ROAST.—Park *Record*, March 12: Arrangements are being perfected for putting in a Stedefeldt gas plant for drying and roasting ores at the Ontario mill. The plant will be located on the site of the big stack now being torn down, and will be applied first on the No. 2 side of the mill. Mr. Stedefeldt will have full charge of the construction and the foundation is now being put in. This step is rendered necessary on account of the growing scarcity, and consequently high price, of wood. The Apex mine is in a quandary. Its rich ore above the tunnel level is becoming exhausted, and the company dares not go below that for fear of water. There is a big mine there, if machinery was put in capable of handling the large volume of water.

IT IS A MINE.—Rosscamp & Glenn are working hard on their recent discovery on the west side of Thayne's canyon. The vein is opening up quite favorably and gives every indication of becoming a paying mine. The vein is six feet wide and was encountered in the long tunnel started by them last summer, after driving a distance of 190 feet. The vein is nearly all ore and they have about 60 tons on the dump, and say they will be able to ship about 200 tons as soon as the roads get in shape for hauling.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING MARCH 8, 1892.
470,537.—FLY SCARE—J. C. Baker, Butte City, Mont.
470,176.—MECHANICAL MOVEMENT—F. P. Burkhardt, Spokane Falls, Wash.
470,546.—HEAT REGULATOR FOR COOKING STOVES—Virginia M. Cone, Alameda, Cal.
470,618.—ADJUSTABLE CLUTCH—D. W. Freeman, Fishhawk, Or.
470,565.—STEAM EXCAVATOR—I. N. Hennessy, Ilwaco, Wash.
470,571.—HYDRANT VALVE—J. D. Hooker, Los Angeles, Cal.
470,575.—CAN-CAPPING MACHINE—M. Jensen, Astoria, Or.
470,495.—WHEEL PLOW—Lamborn & Rickards, Dixon, Cal.
470,502.—CULTIVATOR—D. F. Oliver, Oakland, Cal.
470,211.—DENTAL MOUTH MIRROR—R. F. Phillips, San Diego, Cal.
470,366.—FRUIT JAR—F. A. Potter, S. F.
470,505.—ELECTRIC CAR BRAKE—J. Redmond, Seattle, Wash.
470,600.—HOP PRESS—P. Riggs, Crowley, Or.
470,272.—TIME VALVE—H. Vignere, San Diego, Cal.
470,565.—CAN-CAPPING MACHINE—Wm. Wedgwood, S. F.

The following brief list by telegraph, for March 15 will appear more complete on receipt of mail advices:

California—Washington Berry, Angel Island, sash balance; Calvin C. Bowen, San Francisco, manuscript holder for speakers and device for moving and displaying speakers' manuscripts; Darwla Livermore, Los Gatos, sash fastener (reissue); Alexander W. MacArthur, San Francisco, winter game apparatus; George W. Merk, San Francisco, cooking utensil; Adolph Sommer, Berkeley, solution of lactic acids in oils and fats and dissolving lactic acids in oils and fats; Herman Welsh, San Diego, adjustable pick-point. Designs—Augusta M. Warner, San Francisco, game board. Oregon—Joseph Bell, Troutdale, feed water heater; John B. Mohana, Freewater, locomotive. Arizona—Joseph H. Himilil, Globe, fountain attachment for inkstand.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FLY SCARE.—Jonathan C. Baker, Butte City, Montana. No. 470,537. Dated March 8, 1892. The object of this invention is to provide a general system for frightening flies, especially adapted for use in restaurants and dining halls, said system being arranged and its operation effected in a simple but effective manner. The fly scare consists of a plural number of sets of strings connected into a single system, said strings crossing each other at an angle and being connected with each other at their points of intersection. Rubber bands are attached to the ends of the strings, whereby they are supported from the walls of the apartment. A motor is secured to the end of one string of the system, and by it the whole system is moved back and forth. Agitators are suspended from the strings, and by these the insects are frightened away and will not settle on the tables.

CAN-CAPPING MACHINE.—Wm. Wedgwood, San Francisco. No. 470,368. Dated March 8, 1892. This can-handling machine is intended to present a succession of revolving cans to the operator in order to solder their caps. The object is to provide a rapidly operating machine for carrying into position before the operator a series of cans which are caused to revolve, whereby they may be properly subjected to the soldering iron to secure their caps.

CULTIVATOR.—Doctor Franklin Oliver, Oakland. No. 470,502. Dated March 8, 1892. This invention relates to that class of wheeled cultivators in which the frame is adapted to be raised and lowered by connections with a rocking axle. The object of the invention is to provide a simple and strong cultivator, easy and accurate of adjustment to regulate its teeth either in or above the ground and in the frame of which the teeth may be readily placed and varied both as to number and position.

FRUIT JAR.—Francis A. Potter, S. F., assignor to one-half to G. W. and Wm. Dieffenbacher. No. 470,366. Dated March 8, 1892. This is a glass jar formed with a flange surrounding its orifice and an exterior ledge, a separate hand or ring secured to the periphery of the jar and bounding the ledge, and a glass cover with its rim fitting down over the orifice flange into the annular channel formed between said flange and ring or band, said rim resting on the ledge and raising the cover above and free of the orifice flange. For hermetically sealed goods, it is very desirable to use glass jars and glass covers. The difficulty has been to make a glass cover fit tightly to a glass jar, and especially to one having a large mouth or opening; and in those cases in which this result has been attained, another difficulty has presented itself, namely, that of getting the cover off. The object of this invention is to provide a simple and practicable construction whereby a glass cover can be tightly fitted and sealed to a glass jar and can be easily removed when desired, said jar having also as wide a mouth or opening as may be required.

The California Miners' Association.

Officers, Committees and Constitution and By-Laws of the State Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized.

The officers of the Association are as follows:

HON. J. H. NEFF.....President.
W. C. RALSTON.....Secretary.
THOS. B. EVERETT.....Ass't Secretary.
H. PICHON.....Treasurer.

VICE-PRESIDENTS.

NAME.	COUNTY.
R. F. Grigsby.....	Napa
Henry Martin.....	Trinity
Geo. W. Thomas.....	Martin
Frank R. Wehe.....	Sierra
Woolston Banghart.....	San Mateo
R. H. Campbell.....	Siskiyou
Jas. O'Brien.....	Yuba
Frank Fitzgerald.....	Inyo
A. B. Call.....	Amador
Dixon Brabban.....	Plumas
J. F. Ryan.....	Humboldt
Aaron Bell.....	Shasta
H. O. Harvey.....	Sacramento
D. K. Perkins.....	Butte
A. M. Hardle.....	San Luis Obispo
A. Tregidgo.....	Nevada
Ex-Gov. H. G. Blaisdell.....	Alameda
T. B. Morse.....	Calaveras
Hon. A. M. Clark.....	Fresno
Hon. J. K. Luttrell.....	Sonoma
J. Crawford.....	El Dorado
R. M. Folger.....	Mono
Geo. F. Hoyte.....	Orange
R. McMurray.....	San Francisco
W. S. Chapman.....	San Francisco
I. C. Stump.....	San Francisco
C. T. Lacy.....	San Francisco
J. C. Ralston.....	San Francisco
John W. Maxwell.....	Tuolumne
Hon. R. Clark.....	Colusa
C. F. Reed.....	Placer
Chas. Bogan.....	Mariposa
James H. Lawrence.....	Merced

EXECUTIVE COMMITTEE.

Hon. J. H. Neff, Placer.	H. A. McCrancy, Lake.
Louis Glass, San Francisco.	Jas. Tunstead, Marin.
Ool. Dan M. Burns, S. F.	A. M. Bryant, Mono.
Col. F. McLaughlin, Butte.	W. K. Aldersley, Napa.
S. K. Thornton, S. F.	Chas. Bogan, Mariposa.
Wm. Irelan Jr., S. F.	Jas. H. Lawrence, Merced.
Hon. W. O. Cross, Nevada.	Hon. J. M. Walling, Nevada.
Chas. G. Yale, San Francisco.	D. O. Pixley, Orange.
J. B. Hobson, Placer.	John Spaulding, Placer.
Hon. Edw. Coleman, Nevada.	W. W. Kellogg, Plumas.
Hon. A. Walrath, S. F.	M. M. Drew, Sacramento.
Hon. J. K. Luttrell, Sonoma.	Thos. R. Church, S. F.
Ex-Gov. H. G. Blaisdell, Ala.	John Hays Hammond, S. F.
meda.	Myron Angel, S. L. Obispo.
Hon. Jno. Daggett, Siskiyou.	N. J. Brittan, San Mateo.
Hon. E. O. Voorheis, Amador.	George M. Pinney, Sierra.
E. W. Fogg, Butte.	R. G. Hart, Shasta.
John F. Davis, Calaveras.	A. W. Dana, Sonoma.
John Boggs, Colusa.	A. Hewell, Stanislaus.
Hon. Thos. Fraser, El Dorado.	C. P. Berry, Sutter.
Mr. McDonald, Fresno.	C. McFarahan, Tuolumne.
W. H. Pratt, Humboldt.	G. O. Kinball, Tehama.
Hon. Patrick Reddy, Inyo.	John McMurray, Trinity.
J. O. Miller, Kern.	O. G. Mayo, Yuba.

FINANCE COMMITTEE.

Louis Glass, San Francisco	Edward Coleman, Grass Valley.
Wm. Irelan Jr., S. F.	S. K. Thornton, S. F.
N. J. Brittan, San Mateo.	John Hays Hammond, S. F.

COMMITTEE TO FORMULATE AND PROMOTE THE ADOPTION OF AMENDMENTS TO MINING STATUTES.

Hon. Niles Searles, of Nev.	J. M. Fulweiler, Placer.
vada.	H. I. Thornton, S. F.
Hon. O. W. Cross, S. F.	Hon. J. K. Luttrell, Sonoma.

COMMITTEE OF CONFERENCE WITH RIVER AND HARBOR CONVENTION COMMITTEE.

R. G. Hart, Shasta.	Wm. Irelan Jr., S. F.
Frank McLaughlin, Butte.	J. B. Hobson, Placer.
Hon. J. K. Luttrell, Sonoma.	

DELEGATES TO WASHINGTON.

Hon. Niles Searles, of Nevada County.	
Hon. J. K. Luttrell, of Sonoma County.	
Robert McMurray, of Nevada County.	
J. B. Hobson, of Placer County.	

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

Sec. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of this organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of eleven members selected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

Sec. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

Sec. 3. The President and Secretary of this Association shall be ex officio President and Secretary of the Executive Committee.

tion shall be ex officio President and Secretary of the Executive Committee.

Sec. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of the Association.

Sec. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein prescribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

Sec. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall render annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

Sec. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by this President and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of the Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at this city and county of San Francisco.

Sec. 2. It shall be the duty of the Vice-Presidents of this Association to at once proceed to the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

Sec. 3. All persons friendly to the mining interests are eligible to become members of this Association. In this event that there is no County Organization, such person may unite with the State Association by forwarding his name to the Secretary thereof, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

Sec. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected as such County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by the Executive Committee, Jan. 22, 1892.

BY LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittees as they may determine. They shall fill all vacancies of the officers of the Association or members of any committees. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

Sec. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of the annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

Sec. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

Sec. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

Sec. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

Sec. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of such intended meeting.

Sec. VII.—The Secretary and Treasurer shall receive such compensation for their services as the Executive Committee may, from time to time, determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22, 1892.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F., Stock Exchange Building.

MECHANICAL PROGRESS.

Educate the Mind as Well as the Hand.

We find the following good advice to mechanics in the *Manufacturers' Gazette*: Every man who is engaged in any kind of mechanical labor should cultivate studious and observant habits. There is scarcely any description of knowledge but which he will at some time have use for, especially if he ever hopes to rise above the position of ordinary mechanical labor. No man can ever hope to attain distinction as a mechanic unless he educates his mind as well as his hands.

One of the most important acquirements of a mechanic is that he should be able to readily and lucidly convey ideas to another. There are, indeed, many men who, while otherwise competent to direct others, have failed from lack of this faculty, or have refused good positions because they know their weakness in this respect. Perhaps as many foremen fail from this cause as from any other. Undoubtedly this faculty is one to be acquired; it is not one, if there are such, that is born with a man. Every man who works at a mechanical business should labor in the direction of acquiring the habit of concisely expressing his ideas, making this a part of his mechanical education. Talking of such subjects will help a man; writing of them is excellent practice.

A good mechanical eye is also a most essential requisite in a good mechanic. No one can ever attain distinction as a mechanic unless he is able to detect ordinary imperfections at sight, so that he can see if things are out of plumb, out of level, out of square and out of proper shape, and unless he can also detect disproportioned or ill-shaped patterns. This is a great mechanical attainment, and one which can be readily attained by any ordinary person. Of course there are defective eyes, as there are other defective organs; the speech, for instance, is sometimes defective, but the eye is susceptible of the same training as any organ. The muscles, the voice, the sense of hearing, all require training. Consider how the artist must train the organ of sight in order to detect the slightest imperfection in shade, color, proportion, shape, expression, etc. Not one blacksmith in five ever attains the art of hammering square, yet it is very essential in his occupation. It is simply because he allows himself to get into a careless habit; a little training and care is all that is necessary for success. But in these cases the fact is that the eye is not half as much at fault as the heedless mind. Some carpenters acquire the careless habit of using a tri-square every time they plane off a shaving, in place of giving their minds right to their business and properly training their eyes, and unless they cultivate this power of the eye, they will always be at journey work.

Look at the well-trained blacksmith. He goes across the shop, picks up the horse's foot, takes a squint, returns to his anvil, forges the shoe, and it exactly fits the foot. Contrast him with the bungler who looks at the foot, then forges a shoe, then fits the foot to it, often to the ruin of a fine horse. Now, the fault lies in ever allowing himself to put a shoe on that is not in proper shape for the foot. He should determine to make the shoe fit the foot in place of the foot fitting the shoe, and he should follow it up until the object is accomplished.

A very good way to discipline the mechanical eye is to first measure an inch with the eye, then prove it with the rule, then measure a half-inch, then an eighth, and so on, and you will soon be able to discover at a glance the difference between a twelfth and a sixteenth of an inch; then go to 3 inches, 6, 12 and so on. Some call this guessing; there is no guesswork about it. It is measuring with the eye and mind. Acquire the habit of criticising for imperfections every piece of work that you see; do everything as nearly as you can without measuring (or spoiling it), or as nearly as you can trust the eye with its present training. If you cannot see things mechanically, do not blame the eye for it; it is no more to blame than the mouth is because we cannot read, or the fingers because we cannot write. A person may write a very good hand with the eyes closed, the mind, of course, directing the fingers. The eye is necessary, however, to detect imperfections. Every occupation in life requires a mechanically trained eye, and we should realize more than we do the great importance of properly training that organ.

MUST WE SAY GOOD-BYE TO PUDDLED IRON?—The English correspondent to the *American Manufacturer* answers the above

query as follows: Not yet; but the time is coming when we shall have to. Such is the view taken by Mr. Trow, the operative Secretary of the North of England Board, at the annual meeting above referred to, and in support of his contention he pointed to the manner in which puddling furnaces were dwindling in number, there being now 5000 in the North of England compared with 7000 some years ago. The President of the Board, Mr. Whitwell, had first previously expressed similar views upon the same subject. He went so far, indeed, as to declare that the iron age was gone, and, correctly enough, assumed that we must all be keenly alive to the fact that we were coming to the age of steel. "We are told," continued the President, "that steel can now be made cheaper than iron, in quantities, and with less labor. It is satisfactory to reflect that life, in the long run, will be safer with steel than it has ever been with iron." And then, alluding to the great North of England shipbuilding industries, he added: "We see enormous vessels now built of new material, and we note with satisfaction that the number of orders in the shipyards for ships of steel will give work for some time to come, though this will mean the displacement of the older class of vessels."

CAST IRON.—Mr. Thomas Turner recently delivered a lecture on metallurgy in Birmingham, England, in which he remarked that, as the applications of cast iron are almost indefinitely numerous, and, despite the competition of steel, appear to increase rather than diminish, the difference in form and variety of molds is very great. The most general material used for molding is green sand, a black mixture to be found in every foundry, and which gets its name from the fact that it is used in the raw or unbaked condition. For special purposes, dry sand, loam or cast-iron molds are needed, but the Staffordshire district is famous for green sand molding for brass, iron and other metals, and for the improvements in details which have been introduced in order to allow of the production of a large number of the same class of patterns in the shortest time. Molding machines are now being rapidly introduced into many branches of the trade where there is much repetition of simple forms, and it is stated that by this means the cost of moulding can, in some cases, be reduced to about one-sixth of what it formerly cost. The effect of remelting cast iron varies with the character of the metal and with the method of melting. It has been frequently supposed that iron was improved by being melted and kept in the fluid condition, but Mr. Turner's analyses of the test pieces prepared by Sir W. Fairbairn have shown that the effects obtained can be fully explained by the chemical changes that took place, and that the metal loses silicon and absorbs sulphur when it is remelted in the cupola or air furnace. This makes the iron harder, and if it were originally too soft, improves it, while if the metal were too hard at first, every melting only makes it worse. The properties of cast iron are not altered when it is melted in a closed vessel, so as to prevent chemical change.

DIFFERENCE IN THE COST OF GUN-MAKING.—The following may be of interest in connection with the proposed establishment of gun-making plants on this coast: The recent statement submitted to Congress by the Ordnance Bureau of the War Department is interesting as showing the relative cost of making guns at Watervliet and the Washington Navy Yard. The cost of the first 12-inch gun built for the navy was, according to a recently published statement, \$46,476, of which \$41,140.79 was the cost of the forgings and \$5335.21 the cost of finishing and assembling. The first army 12-inch gun cost \$79,426.80, of which \$57,032.80 was for the forgings and \$22,394 for assembling and finishing. The difference in the cost is largely explained by the fact that the navy has had much more experience in the building of large guns than the army, and the forgings for the army gun were bought abroad, while those for the navy weapon were made by the Bethlehem Iron Works.

DOUBLE-SHEAR STEEL.—In order to test the value of analyses, a Sheffield steel manufacturer has bored a bar of double-shear steel, divided it into three equal parts, and forwarded the same for analysis to a gentleman concerned in metallurgy. He has received three varying reports as to the component parts of the same article. He holds to the opinion that no one but the manufacturers who have the secret know exactly how to produce "double-shear steel." The experiment of the analyst is exercising more minds than those of the manufacturers locally affected.

SCIENTIFIC PROGRESS.

What Is Electricity?

The above question is often asked, and many have been the attempts to answer it. With this uncertainty among scientists in general, the average man will be glad to know that even such an authority as Prof. William Crookes, President of the Institution of Electrical Engineers, England, is yet in doubt as to the various theories advanced to explain electric phenomena. He says: "We know little as yet concerning the mighty agency of electricity." In his recent presidential address there is much of interest to the engineer, and we quote the following from the *Railroad Gazette*:

"We have happily outgrown the preposterous notion that research in any department of science is mere waste of time. It is now generally admitted that pure science, irrespective of practical applications, benefits both the investigator himself and greatly enriches the community. 'It blesseth him that gives and him that takes.' Between the frog's leg quivering on Galvani's work table and the successful telegraph or telephone there exists a direct affiliation. Without the one we could not have the other.

"We know little as yet concerning the mighty agency of electricity. 'Substantialists' tell us it is a kind of matter. Others view it, not as matter, but as a form of energy. Others, again, reject both these views. Prof. Lodge considers it 'a form or rather a mode of manifestation of the ether.' Prof. Nikola Tesla demurs to the view of Prof. Lodge, but thinks that 'nothing stands in the way of our calling electricity ether associated with matter, or bound ether.' High authorities cannot even yet agree whether we have one electricity or two opposite electricities. The only way to tackle the difficulty is to persevere in experiment and observation. If we never learn what electricity is, if, like life or like matter, it should remain an unknown quantity, we shall assuredly discover more about its attributes and its functions.

"Experimentalists are reducing the wave lengths of the electrical rays. With every diminution in size of the apparatus the wave lengths get shorter, and could we construct Leyden jars of molecular dimensions, the rays might fall within the narrow limits of visibility. We do not yet know how the molecule could be got to act as a Leyden jar, yet it is not improbable that the discontinuous phosphorescent light emitted from certain of the rare earths, when excited by a high tension current in a high vacuum, is really an artificial production of these electrical rays, sufficiently short to affect our organs of sight. If such a light could be produced more easily and more regularly, it would be far more economical than light from a flame or from the arc, as very little of the energy in play is expended in the form of heat rays. Of such production of light, nature supplies us with examples in the glow worms and the fireflies. Their light, though sufficiently energetic to be seen at a considerable distance, is accompanied by no liberation of heat capable of detection by our most delicate instruments.

"Alternating currents have at the best a rather doubtful reputation, but it follows from Tesla's researches that as the rapidity of the alteration increases they become not more dangerous, but less so. It further appears that a true flame can now be produced without chemical aid—a flame which yields light and heat without the consumption of material and without any chemical process. To this end we require improved methods for producing excessively frequent alternations and enormous potentials. Shall we be able to obtain these by tapping the ether? If so, we may view the prospective exhaustion of our coal fields with indifference. We shall at once solve the smoke question, and thus dissolve all possible coal rings. * * * Electricity seems destined to annex the whole field, not merely of optics, but probably also of thermotics. * * * Rays of light will not pass through a wall, nor, as we know only too well, through a dense fog. But electrical rays of a foot or two wave length, of which we have spoken, will easily pierce such mediums, which for them will be transparent."

IS THE NEW JENA GLASS A FAILURE?—A photographic contemporary announces the fact, with some show of importance, that Mr. Berthiot of Paris has made a lens of the new Jena glass of a focal length of nine inches, which will sharply cover a plate 6½ by 4¾ inches, at an intensity of 1-11. He fails to find anything remarkable in this fact, and thinks it is only another proof that the new Jena glass which was heralded with so great a flourish, has failed as yet to do any-

thing toward the improvement in construction of the photographic lenses. There is no question, however, that when the makers succeed in overcoming its hygroscopic nature, there is a considerable future in store for this glass for photographic lenses, but the necessity that arises at present for sacrificing it between harder elements, makes "the game not worth the candle."

Cloud Rain.

Mr. John Aitken, the well-known meteorological investigator, to whom we are indebted for the discovery of several fundamental facts in connection with the formation of fogs and dew, has been investigating clouds from the summit of the Rigi and Pilatus. He now finds, as in former observations, that fog is intimately dependent on the presence of dust particles in the air, each of the invisible granules forming the nucleus of a tiny head of water, these vesicles constituting in the aggregate clouds, mists, and their kindred. At elevated situations the air is comparatively free from dust, while lower down it is full of it. But while clouds are passing over a peak the number of particles varies considerably. This, he discovers by a series of carefully compiled data, is due to the fact that the air entering into the clouds has forced itself up from the valley below. Hence the mountain air is pure or impure in exact accordance with the amount of the lower current which has reached it. When the cloud vanishes, the ether resumes its old composition.

Another curious fact just discovered by the same indefatigable observer is that the moment a cloud forms, it begins to discharge its contents in the shape of a steady shower of minute drops. These drops are not capable of being appreciated by the unassisted senses; but by the "fog counter," an instrument of Mr. Aitken's invention, the exact number falling on a given space can be readily noted. What is still more curious is that though the air is in such circumstances saturated with damp, seeds, stones, and other large objects near the earth are perfectly dry, the drops being evaporated by the radiant heat of the ground; but a pin's head or other small object, not offering the same area, is in these circumstances often covered with a minute globule of water. The fact of a cloud thus beginning to rain small drops whenever it is formed may account for the disappearance of these vaporuous masses by gradual exhaustion, without any change in the wind or temperature.—Scientific American.

CAN SOUND BE PRODUCED BY COLOR WAVES?—It is said that certain scientists are just now very much interested in what is claimed to be a new scientific phenomena. Briefly, a beam of sunlight is made to pass through a prism, so as to produce what is called the solar spectrum, or rainbow. On placing the ear to a vessel containing silk, wool or other similar material, upon which the colored lights are made to fall, distinct sounds are heard. Thus, if the vessel contain red worsted, and the green light flashes upon it, loud sounds will be given, but only feeble sounds when the red and blue parts of the rainbow fall upon the vessel, and other colors make no sound at all; in a word, every kind of material gives more or less sound in different colors, and utters no sound in others.

ATMOSPHERIC PRESSURE.—A man weighs less when the barometer is high, notwithstanding the fact that the atmospheric pressure on him is more than when the barometer is low. As the pressure of air on the ordinary-sized man is about 15 tons, the rise of the mercury from 29 to 31 inches adds about one ton to the load he has to carry.

JUPITER'S MARKINGS.—The red color of the markings on Jupiter is believed by Mr. Barnard, the eminent astronomer, to be an indication of their age, the spots of markings (other than the white spots) being dark or black on first appearance, but afterward becoming red. The great red spot seems to be no exception to the rule.

EXPANSIBILITY OF THE ATMOSPHERE.—A cubic inch of air taken 4000 miles above the earth's surface would expand sufficiently to fill a sphere 2,000,000 miles in diameter. By the same law, if a well could be dug to the depth of 46 miles, the density of the air at the bottom would be as great as that of quicksilver.

A NATURAL CEMENT.—A discovery of great importance to South Africa is a stone capable of being burned into a natural cement of good quality. The deposit covers 1000 acres, and varies in thickness from 10 to 20 feet.

ELECTRICITY.

The Electric Lighter.

One of the most delightful of the minor accessories that electricity furnishes to the household is the newly invented "electric lighter." This is a beautiful ornament for the parlor, dining-room or chamber, always instantly responsive to a call for light, and of valuable service in other ways to the family.

It is operated by pressing the little button, when the light instantly appears. It is made of highly polished nickel plate, is but six inches high, and occupies only six square inches on the table or mantel. Its construction is so simple it can be readily taken to pieces and as easily readjusted to working order. It needs no wires or connections, the current of electricity being generated by chemical action within the cylinder. It is perfectly safe, always secure, and a child can operate it.

The material used in the battery is sold by every druggist, and a charge costing but ten cents is sufficient to keep it in constant service for 30 to 60 days. With usual care, it will last a lifetime, and if it should become disabled by an unfortunate tumble, any damaged part can be replaced at trifling expense. Its construction is so handsome and ornamental that it will readily find its place among the bric-a-brac of the choicest apartments, and is easily portable from room to room.

It will be found a most desirable companion for the merchant or lawyer in his office, the professional man in his study, the student in his lodgings, as well as the housewife, and its neatness and quick responsiveness will recommend it to all.

It is manufactured and sold by the Barr Electric Manufacturing Co. at No. 17 Broadway, New York. The price is \$5—a veritable trifle when its beauty and service are considered.

Though originally designed simply for a lighter, it has been found practicable to add several useful accessories. A medical coil with hand electrodes can be readily attached, by which gentle or sharp electric shocks can be given to a member of the family afflicted with nervous affections, rheumatism, neuralgia, lumbago, sciatica, headache, etc. This attachment can also be connected by wire to the doors and windows of the house, thus providing the homestead with a complete and perfectly reliable electric burglar alarm; or if in a city, it can be connected with a street wire to the nearest police station. The price of the medical coil is \$3.50.

Another adjunct is the call bell, which is also easily adjustable and operated by pushing down the central rod, as in a dinner table or call bell. The price of this, with 100 feet of wire, is but \$1.25.—Ex.

ELECTRICITY IN MINING.—A Placerville correspondent of the *Sacramento Record-Union* says: "The Dalmatia Mining Co. of Kelsey, an English corporation, has recently harnessed into service the heretofore wasted energies of nature by utilizing the mountain stream flowing past its works. By the use of electricity, it has been enabled to work its output of ore at an expense of only 47 cents per ton, inclusive of everything, up to the time the gold reaches the plates. This wonderful reduction in the cost of operating mines has given a great impetus to the hitherto languishing quartz and gravel interest in that section, and leads to the belief that the next season will be one of greater prosperity than any in the record of quartz mining in that locality." A great saving in mining operations, by the substitution of electricity for steam, is reported to have been realized at the Virginus mine, near Ouray, Colorado. It is said that it formerly cost \$15 per ton for coal with which to operate this mine, as all fuel had to be transported up the mountains on burros. The cost of coal reached \$100 per day, or an aggregate annual expense of \$36,000 for fuel alone. Every cent of this heavy running expense is now saved to the mine owners. The new operating force of the Virginus is water power transmitted by dynamos located at Red Canyon creek, four miles from the mine. In England, says the *Newcastle Journal*, considerable interest is being evinced in mining circles generally, as to the result of an important electric mining installation at one of the Earl of Durham's collieries, which, when finished, will be the largest and most complete electric mining plant as yet erected in England. The operations to be effected consist of electric haulage, winding, pumping, lighting, etc.

ELECTRIC POWER STATIONS IN GERMANY.—In Germany, considerable attention is being paid at present to electric

power stations. In the eastern part of the Empire there are a great many fine water power locations which can be used to great advantage in developing electric power. A number of companies has been formed for that purpose, among which is the *Societe Industrielle* of Mulhouse, Alsace. This company has offered a medal and prize of about \$500 for the best memoir on the subject of distribution of power from a central station having special regard to the industrial district of Upper Alsace.

HOME-MADE ELECTRICITY.—A French chemist is said to have devised a method by which the common stove may be used as a generator of electric light for the house, as well as for heating it and cooking for the family. The *Philadelphia Record* says: "A French chemist, who has been giving considerable attention to the problem of heating and lighting from a single source, has devised a novel stove, which in appearance resembles an ordinary heating stove. It is so arranged internally that the waste heat is utilized for the generation of electricity. This is secured by a number of rectangular boxes of sheet iron, containing the necessary metallic elements for furnishing the current. These elements are insulated by asbestos, and the cooling is effected partly by the shape in which the metallic alloys are cast and partly by a circulation of air. The current obtained is not great in amounts, but the result of this attempt seems to be favorable. Accumulators are used for storing up the electricity, and as the heating is required for a much longer period than for lighting, the electrical energy, which would be lost during the hours of daylight, is saved. A point of considerable moment is that the heat utilized in this way is waste heat, so that any portion that can be recovered in the form of electricity is so much gain."

HEATING BY ELECTRICITY.—The *Electric Review* says: "Heating by electricity seems to be making considerable headway toward a more popular use, notwithstanding it is more expensive than any of the older forms. It is combating the same objection that the electric light met with in its early days, but unquestionably it is a much more desirable method for most uses, and will surely grow in favor. It is somewhat of a luxury at present, but as the cost of the electric current is reduced, and each year has seen an improvement in that direction, due to the use of more economical machinery and methods, it will soon reach a point of economy where its more general adoption for general purposes will be feasible." An Eastern exchange, in referring to the above, says: "This important problem is claiming the attention of electricians. The smoke nuisance in the larger cities has caused a demand for other means of supplying heat than by the use of coal. Pittsburgh was changed from one of the most undesirable places in which to live or transact business into one of the most delightful by the change from coal to gas. The dense clouds of smoke which hang over Cincinnati, shutting out the sun and making the air unfit to breathe, would be removed to a great extent by the use of electricity for heating, and other cities would be equally benefited."

ELECTRICITY AT THE WORLD'S FAIR.—It is said that Prof. Barrett is in a quandary. Electricians are calling for more room than the World's Fair electricity building has. There are just 207,000 square feet of space to divide. Germany and England have each been assigned 20,000 square feet, and France will use the same area. American firms have already applied for 200,000 square feet, and more applications are coming in daily. There will evidently be no lack of exhibits in the branch of electricity, at least.

A CURIOUS RESULT has followed the introduction of electricity for street-lighting in Orizaba, Mexico. Millions of insects have been attracted from the mountains, and their dead bodies have collected in great heaps about the lamp posts. Under a hot sun, an unbearable stench has risen from the decaying masses, and fever has broken out among the inhabitants. It has been found necessary to send out wagons every morning to carry away the dead insects.

MOUSE POWER.—A "two mouse power" electric motor and battery is being introduced by the Electro Novelty Co., 9 Knapp street, Boston. The little machine is said to be a perfect working model of the Edison dynamo.

CAST AND MALLEABLE IRON IN THE SAME STRUCTURE.—It has recently been proved that when cast and malleable iron are used in the same structure a galvanic action is set up between them and the malleable iron is corroded.

USEFUL INFORMATION.

TEA CHEST LEAD.—Quite an industry appears to be growing up in New York and Boston, where large quantities of tea is imported, in connection with the mattings with which the boxes are enveloped and the lead lining which is placed between the box and its contents. The mattings are mostly baled and shipped to London, where they enter into various uses. They are also used to a considerable extent in this country. In regard to the lead linings a much larger use is made. China has been noted from all time for the purity of its lead and the great value of its lead mines, and this tea chest lead, as it is called, is regarded as the finest in existence. It commands five cents and upward a pound, and finds ready buyers. There are many uses for it, and it is especially valuable in making the best kinds of solder. It is excellent in preserving furs and delicate fabrics, and is much sought for by military and naval men in which to wrap their dress uniforms, for it not only preserves the cloth, but prevents the gold ornaments from tarnishing. One would think that, where so much of this sheet lead is made use of as in China, there would be machinery employed in its production; but such is not the case, and every sheet of it is made by hand and in the most primitive fashion. A large brick is provided, the size of the sheet of lead to be made, and this brick is covered with two or three sheets of paper. On this paper the molten lead is poured, and another brick is placed on top, which flattens the lead out to the required size and thinness. The sheets are then soldered together to the size of the interior of the tea chest, the tea packed in and the top sheet fastened in place. The workmen are very expert, and turn out a vast number of sheets in the course of the day, and where labor is so cheap, at a price much less than it could be made by machinery.

SUGAR IN MORTAR.—A correspondent of the *Scientific American* writes that journal from Big Stone Gap, Virginia, as follows: "I wrote to you some time ago for a paper giving information about using sugar in plastering mortar; you sent me one, but the article in it did not suit our case, so we determined to experiment on it. Thinking the result of experiment may be of some use to you or your readers, we will send it. We use the cheapest grade of beet sugar, costing here four cents a pound, and all lumps must be mashed up before putting in the mortar. The mortar must be dry or "stiff" when the sugar is put in, as it makes it very soft when mixed thoroughly. We put the sugar in when we temper it for putting on the walls, and put it in the hair mortar only, or first coat, and use about 40 pounds sugar to the 100 yards. It is a little harder to put on than without sugar. But the result is, we have a wall that cannot be easily damaged. We can draw a trowel corner over it, and bearing on hard can merely mark it. It does not crack by pounding on it, nor can the clinches be easily broken off. It does not color the white coat any, and we can find no fault with it, while on the other hand it is far superior to the unsweetened. Would like to know of some one else's experiments. We figure the extra cost at four cents per yard. Our sand here is very poor and loamy."

LOCOMOTIVE SPARK ARRESTERS.—Sparks from locomotives are rarely the cause of fires in England. In a recent suit against the Great Western Railway for the burning of hay ricks, the engine was shown not to have been equipped with a spark arrester, but the company claimed that it had used every reasonable precaution by the use of special contrivances, viz., a brick arch, a smoke deflector plate, and tubes of small diameter. Expert evidence was to the effect that spark arresters are in use on certain English railways, but are not looked upon with favor and are going out of use. The verdict was for the company. During the three years, 1888, 1889, 1890, the Great Western Railway trains ran 100,000,000 miles, and there were but six claims for damages due to sparks, only two of which claims were substantiated.

UNIVERSAL JOINTS FOR GLASS TUBES.—A glass ball and socket joint will sometimes be found very convenient for making connections in pneumatic apparatus, etc. Such a joint, as invented by Professor McLeod, can be easily made in the following manner: One end of a glass tube is thickened by heating it in a blow-pipe flame. This is to constitute the ball. For the socket a thick bulb blown in a similar piece of glass tube is cut in half. Ball and socket are then ground together by means of emery and solution of soda; and the joint is finally polished with rouge and soda solution. By

slightly greasing it, and placing a little mercury in the cup, a perfectly air-tight and flexible connection is obtained.

THE CALLA BULB AS FOOD.—It is said that the bulbs of the calla lily, which grows in such abundance all over California and the Southern States, are very edible. The tuber must first be boiled to get rid of its acrid taste. After boiling, it may be fried, roasted or hashed with cream, when it becomes very palatable and tastes much like a potato, except that it is more mucilaginous. Florida farmers are said to be planting it by the acre.

THERE are now 120 women in the Berlin telephone exchanges. It has been decided to employ only women in the future, as their voices are much more audible than men's, owing to the higher pitch.

GOOD HEALTH.

Warmth in a Sick Room.

Warmth is a most essential factor in the management of disease. A medical writer says: "A person in a very warm room, without any other treatment, will be safer with the disease than if he were in a cold room, with the best possible treatment otherwise. Again, a person seized, as patients usually are, with a chill, or with headache, or with general aching of the body—the usual initial symptoms—is liable to the greatest danger unless he immediately seeks the protection of warmth."

THE SICK ROOM TEMPERATURE.

Physicians tell us the proper temperature of a sick room should be from 65 to 70 degrees Fahr., and the heat should not go much below or much above these points. Abundance of fresh air and sunshine is the rule in all cases, except where the order of the physician prohibits the light. There is far more danger of the patient becoming enervated by close, foul air than there is from ventilation. English physicians insist that an open fire is a necessity to the proper ventilation of a sick room, and an eminent authority on this subject says: "I do not consider any room suitable for a patient to occupy during a prolonged illness where there is not an open fire burning on the hearth, in order to secure proper ventilation." A tight stove or a furnace register will not serve any such purpose. On the contrary, the stove throws out a dry heat which can only be partly counteracted by keeping boiling water on the stove. It does not solve in any way the problem of ventilation. The furnace register too often brings up a current of foul air from the cellar or kitchen, into which the cold air box opens. Unfortunately, it is quite the exception to have the cold air box open outdoors, as it should. Even where it so opens, the furnace register does not assist materially in ventilating the room. One of the best methods of removing odors is to take a shovel of burning coals, sprinkle it with coffee and pass it around the room. Where there is infectious disease a deodorizing solution should be obtained from the physician and used in the water in which the utensils of the room, the bedding, and clothing of the patient are washed.

INFLUENCE OF SURROUNDINGS IN PRODUCING INSANITY.—In the last number of the *Journal of Medical Science*, Dr. Savage discusses this question, and begins by protesting against the acceptance of what is a too widely spread notion, viz., that nearly all insanity is the outcome of direct neurotic inheritance. The influence of heredity is not denied or minimized, but the great importance of environment is insisted upon. To quote the words of the author: "We are what we are in mind and body, to a great extent, as organic results of our forefathers; but that we are no longer naked savages is some evidence that progress and development in the individual and the race may take place as the result of changing surroundings." There can be no two opinions as to the encouragement to be got from such a view. A too great insistence upon heredity as the determining cause of insanity must land us in a hopeless pessimism as regards treatment; whereas a recognition of the influence of surroundings is the first step toward the construction of a reasonable and efficacious system of therapeutics. The author also cites many examples of hallucinations and delusions which are suggested by surroundings; and while all will not be inclined to accept his dictum that disorder of function may lead to disease of tissue, there will be few who will not share his opinion as to the efficacy of restful, pleasant surroundings in the treatment of mental disorder, as compared with the virtues of "medicine out of a bottle."



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W. B. EWER..... SENIOR EDITOR

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Miners' Associations.

Sierra, El Dorado, Plumas and Mono counties have joined the procession and organized County Miners' Associations to aid the State Association. Other counties will follow the lead of Placer and Nevada. Shasta and San Francisco are already organized. All the mining counties of the State should have organizations and assist with moral and pecuniary support the movement which has been started.

In Sierra county they held a mass meeting (at Downieville) and organized as a branch of the California Miners' Association. The Sierra Association elected Tiley L. Ford, Pres.; A. J. Meroux, Sec'y; H. Spaulding, Treas. Fifteen Vice-Presidents were appointed and an Executive Committee of eleven.

It is worthy of note that, at the Sierra meeting, as at others, they endorsed the State Association's resolutions to the effect "that all hydraulic mining within this State he not resumed until the action of Congress in the matter of building restraining dams be known." It is very important that this request be obeyed, as much harm will be done by those who persist in mining by this method, after the State Association has pledged its word to try and stop it. Miners in the various counties should use every effort to have such mining stopped at once.

Comstock Management.

The revelations of mismanagement in the Hale & Norcross mine, brought out by the recent litigation, have drawn attention to the fact that the Savage mine, which is next to the Hale & Norcross on the north, is under the control and management of the same parties who have had their methods shown up so plainly in the Norcross suit. The rock is milled (and otherwise manipulated) at the notorious Nevada mill by means of the same annex that has been used on Hale & Norcross ore.

A mine as good as the Savage ought to be in the hands of men entirely above suspicion, so that stockholders would have a better chance for dividends than was shown to be the case in the Hale & Norcross suit. The developments in Savage warrant dividends for the stockholders, and if the ore is only milled honestly they might be paid.

It is stated that on the 900 and 950 feet levels there has been, and is now opened a vein of pay ore which is 40 feet in width and which assays from \$60 to \$400 per ton. An expert (familiar with the Comstock) says that it is the best development that has been shown there within ten years.

The value of this ore body, as shown by the returns from the very peculiarly operated Nevada mill, is from \$17.50 to \$20 per ton. The true value of the ore is thought to be from \$120 to \$160 per ton; yet the shareholders in the company are assessed to take the ore out and mill it.

It is a great pity that, if any such operation as this is going on, it cannot be stopped, as it injures legitimate mining, and also has a bad effect even on mining stock operations even if not true.

It is stated on the street that the same crowd is cleaning up the Rock Point and another mill in addition to the Nevada mill, in order to work as much ore as possible before there is a chance of change of officers at the annual elections.

The question is, What are the stockholders going to do about it? Investigation into Norcross showed a very disgraceful and dishonest condition of affairs. People were making money who had no business to, and those who ought to have received profits, got none. Perhaps some one might have an investigation into the affairs of Savage and some other companies with good effect, and prove or disprove the truth of the suspicions or rumors which prevail. There are doubtless many transactions going on which would not well bear the light of day among some of the companies, but attention has been turned in that direction, and the managers who are not doing as they should, will do well to have a care.

The Mines and the World's Fair.

The California World's Fair Commission does not seem very much disposed to do anything of moment for the mining interests, and now that Mr. McMurray is away in Washington, pay little attention to that industry. They have been sent a gentle reminder by the Executive Committee of the California Miners' Association the Executive Committee of which adopted the following resolutions the other day:

WHEREAS, The State of California has appropriated \$300,000 for the purpose of making an exhibit at the World's Fair, to be held in Chicago; and whereas, the mining counties of this State pay a large share of the said amount in taxes; and whereas the mining industry is one of the most important industries of the State; and whereas, said counties can be but little benefited by the expenditure of said money, except by an adequate mining exhibit; therefore,

Resolved, By the Executive Committee of the California Miners' Association, that a sufficient sum should be set aside from said fund for the purpose of making such exhibit.

Mr. McMurray asked for \$40,000 out of the \$300,000 for the mining industry, but it remains to see how much of this will be given. It is proposed, among other things, to send the collection of minerals now in the State Mining Bureau. This would save

much labor and expense and is the proper thing to do, as the collection already belongs to the State. But other things are also needed. The Commissioners will have to do something for the mining industry, but they must be "stirred up" before they will do it.

A Compliment.

A number of the members of the Executive Committee of the California Miners' Association met at the Association rooms on Friday of last week, and a presentation was made to Mr. Charles G. Yale, editor of the MINING AND SCIENTIFIC PRESS. Mr. J. H. Neff handed that gentleman a very handsome watch of hammered gold, with a double chain of platinum and gold, and a very beautiful platinum and gold locket with a diamond in its face. The watch contained the following inscription: "Presented to Charles G. Yale by his friends, who appreciate his aid in the Hydraulic Mining Interest, San Francisco, March 11, 1892."

The presentation speech was made by Mr. Neff, President of the California Miners' Association, and remarks were also made by Mr. C. W. Cross, N. J. Brittain, and others. Mr. Yale made an appropriate response and expressed his thanks for the handsome mark of appreciation which his friends had given him.

It is proper to state that the funds of the Association were not drawn upon for this present, but the gentlemen who were in the San Francisco delegation of the convention and those on the Executive Committee of the Association, and who had worked with Mr. Yale, individually contributed toward the testimonial.

It happened that Mr. Yale was the only San Francisco man who went up to Auburn, to the Placer County Convention, which originated the State Convention. He served on committees there and was one of those who formulated the State address. He was complimented by the miners of that county by being placed on the Executive Committee of the County Association. To him was entrusted the organization of the movement in San Francisco, and he issued the call, stated the objects, and called to order the first meeting held in this city.

He also assisted in other work connected with the movement in this city and the preparations for the State Convention. At the convention he was on the Committee on Resolutions, and chairman of the Committee on Memorial, the latter document having been written by himself and Robert T. Devlin of Sacramento—Mr. Devlin representing the interests of the farmer and Mr. Yale those of the miner. The gentleman also assisted materially in bringing about the good feeling which resulted between the two formerly contending factions.

After the convention he assisted in the organization of the California Miners' Association in many ways and was especially active in preparing reports, resolutions, memorials, etc., and in attending to such details on committees as his professional experience fitted him for. The gentlemen who have been associated with him in all this work wished to show some mark of appreciation for his valuable and disinterested services, and took this method of doing it. Mr. Yale is now secretary of the San Francisco County Miners' Association—a position without salary, by the way—and also a member of the Executive Committee of the State Association.

A. H.

MAJOR FRANK McLAUGHLIN, of Oroville, has gone East and will assist the miners' committee in matters before Congress. He goes at his own expense and will be of material aid to the miners' cause. Major McLaughlin has forwarded to his colleagues at Washington a number of large size photographs giving a splendid representation of the stupendous works undertaken and accomplished by him on the Feather river, in Butte county.

A Land of Gold.

The Veritable El Dorado in Nevada County.

GRASS VALLEY, CAL., March 14, 1892.

TO THE EDITOR:—Your correspondent has now been in this famous mining town—I won't call it a camp, it has outlived that—since Thursday evening last. To the stranger, Grass Valley and its environs has many pleasant surprises. At this time, the smooth, rolling hills are clothed with rich grasses and the meadows and fields of waving grain, now several inches high, present a beautiful picture when viewed from some elevated standpoint. It is a rare landscape indeed. The bright green of the fields, the dusky red of the rocks where exposed, and the buff and cream color of the dumps and enormous cuts of the old hydraulic mines, form a striking contrast, which is only intensified by the somber shades of the dark pine-clad hills and a sky beautifully clear and blue. Here and there one can catch a glimpse of the snow-clad main range far to the eastward.

One can hardly believe that this is the greatest gold-mining region in all of golden California. It is *El Dorado* in fact. The low rolling hills are actually ribbed with veins of gold, which have added millions to the wealth of the world. Every mountain side is perforated with shafts and tunnels, and every ravine and flat has been turned "upside down" in the search for gold, and they have yielded abundantly.

I have stood within the week by the side of the miner as he wielded his pick in a hole less than six feet deep, and I have gazed down into the black depths of the great shaft which has penetrated the famous Idaho vein for 3000 feet and more. The mines in Grass Valley go down there is no doubt about that. It was proven long ago, but really the good people of this vicinity are the most self-satisfied lot I ever saw. They do not seem to realize the great possibilities of this magnificent region, the veins of which, with a few exceptions, have only been scratched on the surface. There are a score of mines here, now abandoned and dismantled, which paid large sums of money to their owners in the so-called palmy days, when rock that did not mill \$30 to \$60 was too low grade to work. With the improved machinery of today, the magnificent water power available, and the new and cheaper methods of working, many of these mines would again become dividend payers. I refer to such mines as the Eureka, Maryland, Gold Hill, Massachusetts Hill, the famous Allison Ranch and others.

They only require money and experienced management to be operated again successfully. The old works are flooded, and many of them no doubt are in bad condition; but there still remains, I am told, thousands of tons of rock in these mines, which, under the conditions which obtain here to-day, can be made to yield a splendid profit.

There are movements on foot, however, so I hear, to revive operations on Massachusetts Hill, and there is some talk of resumption on the Allison Ranch property. Several old mines have been pumped out, new hoists built and mining resumed within recent months, and the result in every case is said to be satisfactory, and in some instances, marked success has been achieved, notably at the W. Y. O. D. and Peabody.

If this district could be picked up and moved bodily into Colorado, the people of Grass Valley would see something which would astonish them. Within two years there would be 2000 stamps dropping where there are now 200. What Grass Valley needs is new life. There is money enough here, but energy—that prime factor of the active mining town—seems lacking.

MANY NEW STRIKES.

Almost daily, new strikes are reported. Last week it was the Peabody. Rich rock was brought from the lowest part of the mine which eclipsed anything seen for many a day in Grass Valley. This had not ceased to be talked about when the California came to the front with rock running into the thousands, and to-day the Hermosa (called facetiously the Holy Moses) is in bonanza.

Of course, these things make the boys feel good, and do a great deal toward bringing about what is so much needed here—a more energetic policy in the development of new mines and in the reopening of old ones. There is probably not a more favored mining region in the world than that about Grass Valley, and mines can be made to pay here which would be unremunerative anywhere else. If the citizens of this place would try life on the desert in the southern part of this State, or delve in the hills of the "sun-kissed" torrid zone of Arizona for hidden treasures, or even face the snowslides and climb the sky-piercing ranges of Colorado, they would begin to realize what a fine thing they have of it here.

WHAT IS GOING ON.

I do not wish to convey the impression that Grass Valley has gone to sleep altogether. Not by any means. They are at work, and in a few places are accomplishing good work.

Within the year past, the W. Y. O. D. Co. has enlarged its hoisting plant and put in a 125 horse power engine and a ten-inch Cornish pump, which lifts a column of water 307 feet, vertical measurement. Below this is a six-inch pump raising water from the eighth to the seventh level, a distance of 100 feet. At the bottom of the main shaft a sinking pump is kept in constant operation. The shaft is 876 feet deep, on the incline. It has three compartments, and is timbered from top to bottom in the most substantial and workmanlike manner.

There is one thing which I wish to note about this shaft. At a depth of 122 feet the vein changes the angle of dip several degrees. To accommodate this change in inclination, the pump rod had to be deflected upward in ac-

cordance with this change in dip. The old-fashioned travelers and wheels were dispensed with, and a stiff joint has been substituted. It was somewhat of an experiment, but it works perfectly and has reduced the friction from 40 to 20 per cent, theoretically, if not actually. The change in direction of the motion is compensated for by the use of long wedge-shaped pieces of wood which are firmly secured to the under side of the rod, which rides on trolleys or rollers ten inches in diameter. At the junction of the two angles, the rod is solidly spliced and is held in place by a trolley above. The result of this arrangement is that the rod moves in a true line with a minimum of friction and there is no lost motion. The plunger moves the same distance as the stroke at the surface—six feet.

A direct acting hoist is in use, which was made by the Risdon Iron Works. It is run by a 25-horse power engine. It works smoothly and has a capacity of 2000 feet. The hoist is supplied with two reversible drums four feet in

battery, the millman, Mr. Richards, has divided it into four parts, any one of which may be removed at pleasure. It also affords the advantage of placing any section in four different positions in the mortar, in place of changing only top for bottom. A screen can by this means be made to wear more evenly, and consequently lasts longer. A 40-mesh brass wire screen is in use here. The surface plant of the W. Y. O. D. mine is a very complete one and will answer for a long time to come. The arrangement reflects great credit on the superintendent, C. A. Brockington, and his able assistants.

This is one of the mines upon which I look as a model. If its name were "The Criterion," it would fit it exactly. Abandoned and dismantled, the present owners took the property, put on light machinery and went to work. At first the result of their labors was discouraging. They had to light water and then run into hard ground, and to make matters worse, the vein pinched, but they determined to make or

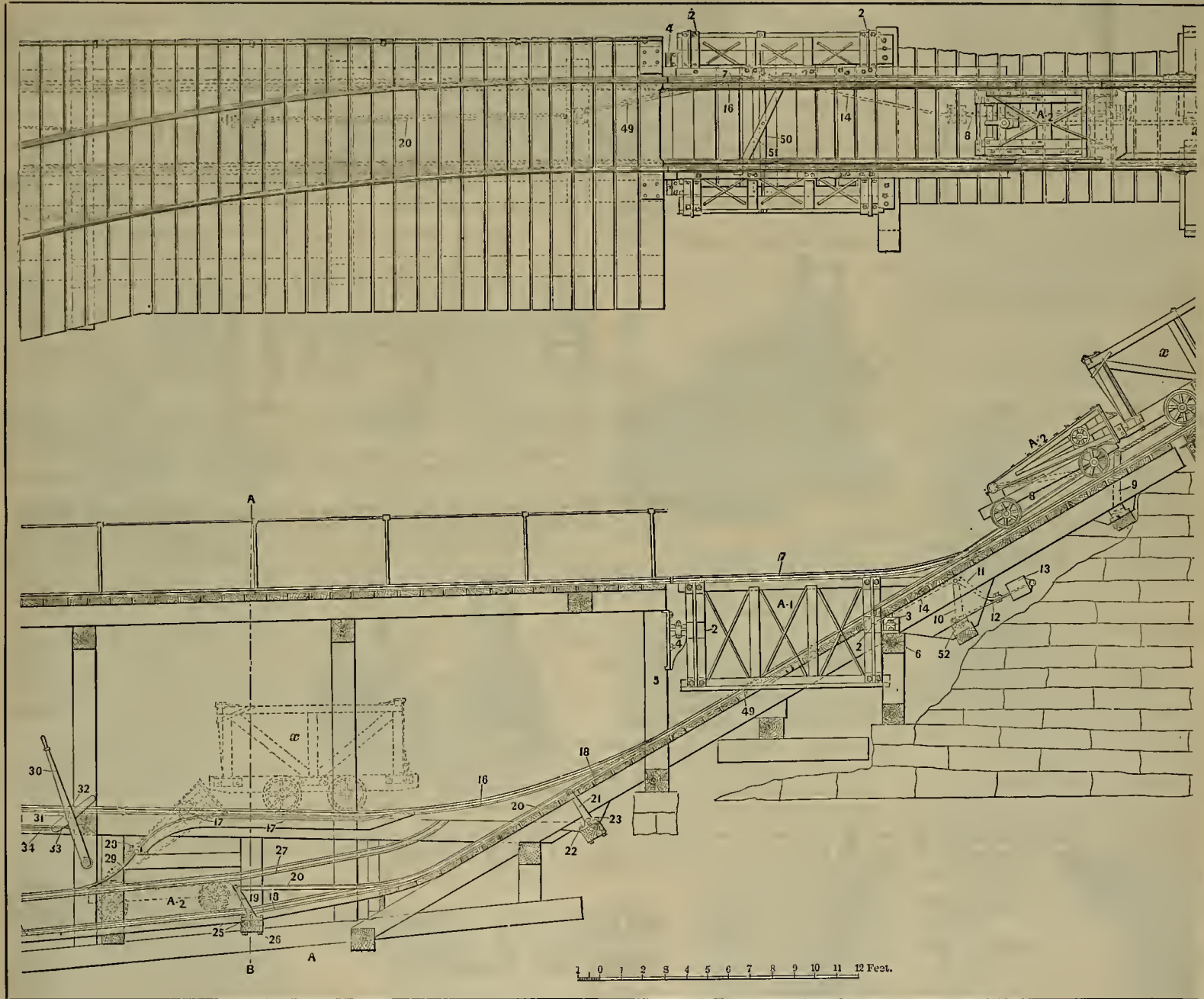
arrangements at the bottom of the iron breaker plane, the commencement of which is shown at the top of the stone wall to the right.

The hoisting rope is attached permanently to the "barney," or small car (A_2) that pushes up the larger one. The barney-track (18) runs continuously and unbroken from the left-hand corner of the barney-pit A to the dump on top of the plane, while the mine car track (16) runs from the end of the loaded car siding up the plane when the bridge A_1 is open, but when the bridge is closed, the track, which runs to an edge at the right hand end, lies over the rail (16) and makes the main car track on the plane continuous on the bridge A_1 to the empty car track.

When the empty car A descends from the dump, it finds the bridge closed until it

the real pitch of the plane, the barney and car are in the position shown on the right hand side of the drawing. It will be observed that the large wheels of the barney, while in the pit, have a rail (27) above as well as below them. This is to prevent the wheels from rising and the barney from getting off the track. From here on the car and barney continue on to the dump. The system of levers (30 and 34) is a self-acting arrangement to drop in a car at a time.

The details of numbered parts of the barney-pit and bridge, shown in the cut, are as follows: 2, trunnion-stanchion; 3, trunnion-pedestal, right hand; 4, trunnion-pedestal, left hand; 5, vertical timber to receive trunnion-pedestal (4); 6, horizontal timber carrying trunnion-pedestal (3); 7, bridge rails; 8, upper rocker-har, automati-



"BARNEY" PIT AND BRIDGE FOR HANDLING AND DUMPING MINE CARS.

diameter, having an 18-inch face. The cables are 2-inch steel wire.

Another novel device is in use at these works in the shape of a heater for the water used in the boilers. It consists simply in discharging the exhaust steam through a six-inch pipe which extends outside the building, where it projects for about 12 feet into a 10-inch pipe, the ends of which are securely fastened to the exhaust pipe, the end of the exhaust pipe being entirely open, however. Between these two pipes the water circulates and reaches almost a boiling heat before being conducted to the boilers. It is a simple and very effective heating arrangement. The hoisting works are supplied with a drying-room, blacksmith shop and all other necessary adjuncts.

The mill has ten stamps with plates inside and out. The very low angle of dip of the latter attracted my attention, but it seems to give satisfaction.

Two true vanning machines are in use and appear to do the concentrating of the iron sulphides perfectly. The quartz contains four or five per cent of concentrates which will average about \$100 per ton. The only really notable thing about the mill of this young company is the fashion of setting their screens. In place of using the usual screen extending across the

break something. Their perseverance and good grit was rewarded. A number of the men, including Mr. Brockington and his foreman, Mr. Connors, the mill foreman, Mr. Richards, and the master mechanic, Mr. Oliver, took part of their pay in stock at a nominal figure. Today the mine is said to be payin', with ore reserves in sight and a splendid vein on the lower levels. The W. Y. O. D. has set an example which the men of Grass Valley will do well to emulate.

In my next I will have something to say about other mines and other miners of this district.

W. H. STORMS.

Handling Mine Cars.

In last week's PRESS, a description was given of the "barney" and pusher for dumping mine cars used at the Cross creek collieries. As stated, part of the coal prepared at the "breaker" (where the coal is sized and sorted) is brought from a mine half a mile away. The loaded mine cars are brought to the foot of the breaker plane hoisted and dumped. The accompanying cut shows the barney-pit and bridge, and

comes to the end of the siding and is stopped, or until it reaches the empty cars already on the siding. The barney being narrower, passes between the sides of the swinging bridge between the rails of the loaded track (16) down the barney-track (18) to the back of the barney-pit.

The bridge A_1 consists of two trusses, each truss having a bearing at either end (3 and 4) so that by swinging around them, the bridge is opened or closed. When the barney descends, it finds the bridge closed; and when it reaches the bar (20), its axle pushes forward by means of (20) the levers (19 and 21) and thus opens the bridge for the full car to go up. When the barney is in the position shown on the right hand side of the figure, it pushes forward the levers (9 and 10) and closes the bridge so that it will be ready for the empty car when it descends.

As the wheels are obliged to follow the track (17), the pusher comes in contact with the car and forces it forward and then up the plane, so that when the car gets on

cally shifted by barney-axle throwing levers (9) and (10), the latter pulling (14) and closing bridge A_1 ; 9, upper idle rocker-lever; 10, upper acting rocker-lever; 11, brace-end supporting counterweight 13; 12, counterweight lever; 13, counterweight to balance bridge-shifting mechanism; 14, upper shifting rod to close bridge A_1 ; 16, mine car rail; 17, rail for elevating pusher on upward motion; 18, rail in pit for barney-truck wheels; 19, lower idle rocker-lever; 20, lower rocker-har for opening bridge, operated by axle of barney-truck on downward motion; 21, lower acting rocker-lever; 22, bearing for (21); 23, bolts for (22); 25, bearing for (19); 26, bolts for (25); 27, overhead guard-rail for barney-truck wheels; 28, bearing for pusher-latch (29); 29, pusher-latch raised on downward motion of barney; 30, releasing-lever; 31, bearing for trip-lever (33); 32, pin for trip-lever; 33, trip-lever for raising stop-har; 34, trip-rod to raise lever; 49, lower shifting-rod to open bridge; 50, bridge-shifter; 51, fixed bar with pin on which shifter 50 turns.

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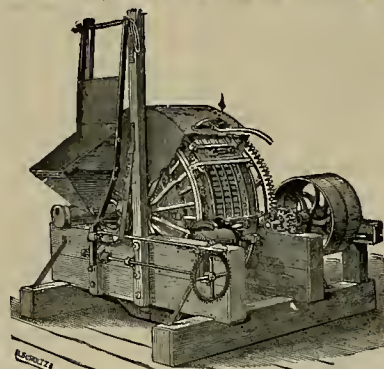
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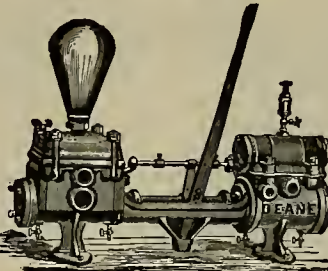
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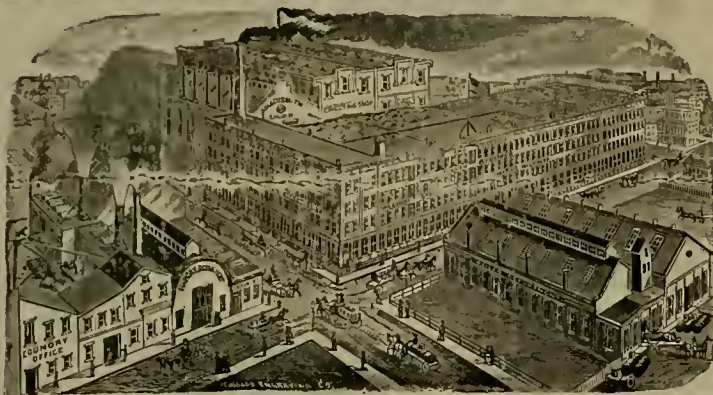
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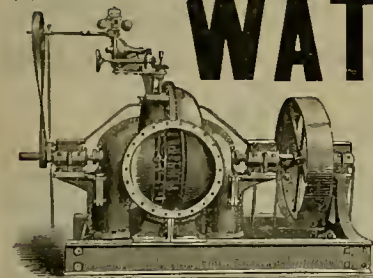
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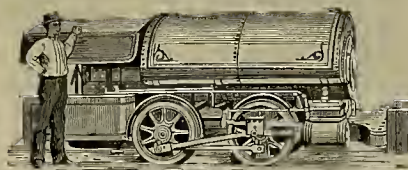
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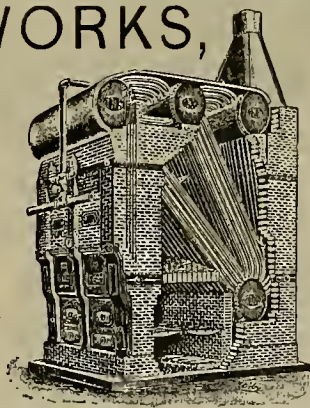
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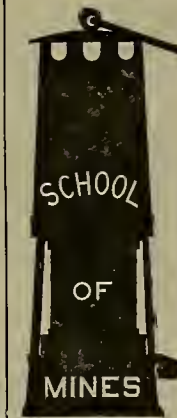
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 17, 1892.

General rains the past week, with cooler temperatures since, have tended to little in promoting a much healthier tone to general trade, and were it not for the exorbitant charges made by the railroad on local freights, that is, on goods shipped out of this city, general trade would be better than ever before, while the volume of goods which would be sent out would show a most remarkable increase. It is confidently expected that we will soon enjoy the benefits to be derived from a competing railroad. When this does take place, then the trade of this city will be more than double. Iron workers report business active with orders ahead. Raw materials continue in their favor. Money is easy, with the rate of interest in borrowers' favor. The following statistics are an interesting study, for they give the gross and net earnings of the savings banks in this State in comparison for five years past:

	Gross.	Net.
1887	\$4,134,444	\$3,112,955
1888	4,969,899	3,677,277
1889	5,907,583	4,377,935
1890	6,917,331	5,131,808
1891	8,059,058	5,956,601

As will be noticed, the gross earnings last year were nearly double the amount reported for 1887, but it must be remembered that in the meantime the number of banks has nearly doubled. Calling the difference between the net and gross earnings the expense account, we find the cost of maintaining these banks from year to year has been as follows:

In 1887	\$1,021,489
In 1888	1,292,622
In 1889	1,529,048
In 1890	1,755,523
In 1891	2,100,457

Eastern mail advices report easy money markets in the various financial centers, with no marked call for funds from any particular source. A singular state of affairs exists in New York, in this, that gold is cheaper there than anywhere else in the world. By this it is meant that gold can be taken from the treasury without charge, and that the rate of exchange is such that every nation in the world is offering an inducement to take gold from this country. England is the last to buy, and France sells only when there is a profit in it. The Imperial Bank of Germany is offering inducements for shipments to Berlin. We do not send gold bars, but it may be said that to-day American double eagles, taken into consideration freight, insurance and exchange, are worth more in proportion to their weight in gold than any other gold coin in existence.

QUICKSILVER—Receipts the past week aggregate 366 bushels. The market is steady at around quotations.

MEXICAN DOLLARS—Exports by sea the past week aggregate as follows: to Hong Kong 125,920 dollars. The market is easy at around 71 1/4 cts.

SILVER—On Tuesday next the Bland free coinage bill will come up for debate in the House of Representatives. From all we can learn the bill will be rushed through and go to the Senate on or about Monday, March 29. It is claimed that the Senate will also rush the bill through so as to get down to other work. There is a diversity of opinion as to what action President Harrison will take but the prevailing belief is that he will veto it, in which case silver will be an important factor in the incoming presidential election. We can not reasonably look for any material change in the silver market until after Congress acts on the free coinage bill. In Europe, attention is centered on this country and therefore the action of Congress on the Bland bill will carry large weight in shaping the course of European countries on bimetalism. The supply of silver in this country is running low, at any rate, the Mint is no longer buying the 4,600,000 ounces a month as required by law. The last steamship for China took out \$31,500 worth of silver to Higo.

BORAX—The market is essentially unchanged both here and at the East.

LIME—Receipts the past week were quite light, aggregating only 1505 bbls. against over 7000 bbls. the week before. The market is reported steady at current quotations.

ANTIMONY—The market is easy. Eastern advices report that last week's quotations can be shaded.

PIG IRON—Imports the past week aggregate as follows: Dundee, 700 tons; Tyne, 200; Hull, 50; total, 950 tons. The market is quoted lower. Even at the decline, any selling pressure is being met by still lower bids on the part of consumers. The low prices ruling at the East, combined with good crop prospects in this State, are against any possible advance in the market this year. Our latest mail advices report that six of the largest iron companies at the South are organizing to act in concert, and that if they succeed in effecting satisfactory arrangements, the new organization will be able to reduce the price of iron obtained. They have an abundant supply of very cheap coal and very cheap coke and plenty of ore with which to do it. The coke only costs about one-half what it did three years ago.

TIN—The market continues to be unsettled and largely in buyer's favor, owing to consumers having their near by requirements met. The stock here is said to be more than enough to meet the demand, but this, so far as plate is concerned, will largely depend on fruit crop prospects at the East.

COPPER—It now looks as if the talk of combine has been so far organized as to warrant the assertion that it is a possibility for future action. It is based on business and not on a speculative basis, and, being such, it will prove advantageous to consumers and producers alike. James Lewis & Sons' circular, under date at London, March 24, reports as follows: After considerable delay in settling the details, about 7000 tons of argenteiferous copper matte have been found for delivery up to the end of the year, at a price based on the price for best selected and good merchantable copper at the time of delivery. Negotiations for the restriction of production in the United States have been resumed, and promise to be successful.

COKE—Imports the past week aggregate 302 tons from Hull and 1233 tons from South Shields; total, 1535 tons. The market is barely steady, notwithstanding free competition.

COAL—Imports the past week aggregate as follows: Swansea, 2207 tons; Coos Bay, 100; Nansim, 335; Departure Bay, 1040; Liverpool, 3981; Tyne, 2696; New York, 200; Philadelphia, 150; Hull, 853; Sydney, 1837; South Shields, 650; Glasgow, 418; Seattle, 3365; total, 25,354 tons. The market is weak, with buyers securing concessions on quotations for spot parcels. The stock here is largely in excess of the demand, while limited export crop weather is a guarantee that the supply for shipment will be heavy. This will be available for fall and winter use.

THE Mineral Farm mine at Ouray, Colo., closed down on Wednesday and discharged all its men, giving as a reason the low price of silver. Its ore is a low grade, but there is no end to it.

Mining Share Market.

SAN FRANCISCO, March 17, 1892.

The mining share market showed more activity in the North End shares under the leadership of Con. Virginia. The Middles barely held their own while the Gold Hillers shaded off under an assessment scare, and the pool crossing orders on the down grade. The market continues in a feverish and unsettled condition, with no attractions as yet for outside money to venture in. Everything still warrants the assertion that there has been no change of heart with the stock pools and mill rings, and until they are forced to concede that outsiders have some rights to the bullion produced, the game will continue to be royal feasts for insiders and woad puddings and financial choices for outsiders. All indications, at this writing, point to the stock pools manipulating for higher prices, probably to unload certain stocks on gudgeons. This will of course be done on wind if it is possible, but if the worst comes to the worst, then ore will be shown up in an unexpected quarter, when the usual results will follow—higher ranges of prices, with outsiders as buyers on the advance and a general declining market with assessments for outsiders, and mine looking for insiders for many months to come. There is another cogent reason why inside pools and rings may find themselves compelled to make the market more attractive, viz: the right waged by the Mining Stock Association to create a reform in the management of the mines, and the fight waged by the Board of Directors of the interest of outside shareholders to make the inside rings buy stock with which to control the mines, have created more opposition than counted on in securing mines for looting. When the market is active outsiders pay very little attention to mine looting and assessments, and therefore insiders movements go unnoticed, or, at least, that has been the case heretofore.

In outside mining shares, trading continues light, although toward the close the Razor Blades were more active under cross orders on Del Monte and Nevada Queen. Several mines in the district (Pascorora) have been saving ore for months past, probably to make a good bullion showing so as to sell the mining shares at quite an advance. No outsider, so far as the writer knows, has come up ahead on an investment in the Razor Blades, but several suicides have followed such investment.

The election of A. K. P. Harmon president of the Potosi Mining Co. and also president of the Chollar Mining Co. is accepted by outsiders as indicating that the mill rings have something in store, but its nature they must either guess or else wait developments. Mr. Harmon was vice-president of the Hale and Norcross Mining Co.

At the Chollar election, Mr. Tingman, Secretary of the Mining Stock Association, read a protest against the way in which the mine has been managed, and demanding that certain reforms be instituted by which the mining and milling of ore will conform to the laws under which the company incorporated. This protest was read, and if not lived up to by the management, the officers will get into serious trouble. Times are somewhat changed and mine directors will soon learn it to their cost.

News from the outside mines are of a more encouraging character. In the Quiltoia district, very important work is being done in several mines. The Silver King Mining Co.'s mill is being moved to the mine which will save a heavy expense. Ore is being assayed for millage. In the Bodie district, Mono has cut a foot of rich ore, which is to be well prospected. Bodie had 100 tons of ore milled, which assayed, in the pulp, over \$38 a ton. The mill is now running on Summit ore. The Standard Co. reports several improvements. The Superintendent of this mine (Standard) does not give either car-sample or battery assays, but the results of this failure of the reports are first-class and a decided improvement on the reports from any mine in either that or the Comstock district.

From the Comstock mines, our advices continue of a most favorable character, confirming everything heretofore published by the Press. Official letters begin to hint in the proper direction, and possibly the Superintendent of the mine will begin to develop work is being done may tell a little more than they are now allowed to do by the mill rings; yet what is the use of ore while the rings get the bullion and outsiders get left with assessments to pay. Confirmed advices are received regarding the development in Savage on the 950 and 900-foot levels. Why don't the Directors of this mine insist on Supt. King and his Levy resigning? It is said that if this is done, the mine will be differently worked. It looks as if work in Con. Virginia is being done to make the stock more attractive. The last deal was made on assays, now it may be done on work in a mine. The Potosi, and also the Overman managements, played the winzack racket to perfection. Work in the Middle mines is being closely watched. More miners, and more capital, are put to work in the Potosi. The Gold Hill mines never promised better results than they do now, but the rings are still in the ascendancy, which creates distrust in the minds of operators.

Authentic reports are current that the Hale and Norcross management is negotiating for a lease of the Occidental mill, and that the Savage Co. will get the Rock Point mill to reduce ore. Rumors are current of several other changes contemplated to be made in the near future. If the output of ore in the Bodie district continues to increase, more milling capacity will be required very soon.

San Francisco Metal and Coal Market.

THURSDAY, March 17, 1892.

ANTIMONY.		STEEL.	
Per lb.	@ 14	English, lb.	@ 20
Refined, in car lots 8 @		Canton, lb.	@ 9
Powdered, do. 8 @		Bik Diam'd tool 9 @	9
Concentrated, do. 7 @		Pick & Hammer. 8 @	10
All grades jobbing at advance.		Machinery.	@ 5
		Toe Calk.	@ 4
COPPER.		IRON.	
Bolt.	@ 22	B. V. steel grade.	@ 6 00
Sheathing.	@ 22	14x20, spot.	@ 6 00
Ingot, jobbing.	@ 14	Obacoral, 14x20.	@ 6 00
Bar, jobbing.	@ 22	Do, do, 20x20.	@ 12 00
Fire Box Sheet.	@ 24	Do, do, 20x20.	@ 12 00
IRON.		PIG TIN.	
Bar, base	@ 3	Spot 30 lb, irreg.	@ 21
Norway, base.	@ 4	ular, nominal.	@ 20
PIG IRON.		COKE.	
Spot.	@ 25	Wellington.	@ 8 00
Ellington.	@ 25	Grella.	@ 7 25
Glenbrook.	@ 25	Nansim.	@ 7 25
Am. Safe, No. 1.	@ 25	Gilman.	@ 7 50
Do, No. 2.	@ 25	Seattle.	@ 7 00
Puget Sound.	@ 30	Coos Bay.	@ 6 00
Clay Lane White.	@ 30	Cannel.	@ 5 50
Langdon.	@ 30	Chamberland, in sacks.	@ 15 00
Do, do, 20x20.	@ 30	Do, bulk.	@ 14 00
Gartsberrie.	@ 30	Walsend.	@ 7 50
Barrow.	@ 25	Scotch Splint.	@ 7 50
Caronhook.	@ 23	Do, do, 20x20.	@ 7 50
CHROME IRON ORE.		COKE.	
Per ton.	@ 40	West Hartley.	@ 8 00
LEAD.		TO LOAD - PER TON.	
Plg.	@ 4	Australian.	@ 7 00
Bar.	@ 5	Scotch Splint.	@ 7 00
Best.	@ 7	Cardiff.	@ 7 00
Pipe.	@ 6	Lehigh Lump.	@ 12 00
SILVER.		COKE.	
(Discount 10% on 500 bags.)		Chamberland.	@ 13 00
Drop. 10 bags.	@ 1 90	Do, do, 20x20.	@ 12 00
Drop. 20 bags.	@ 2 30	Do, do, 20x20.	@ 12 00
Obilid. do.	@ 2 30	West Hartley.	@ 7 50
QUICKSILVER.		COKE.	
Home trade, pr.	@ 43 00	English, to load.	@ 11 00
For export.	@ 43 00	Do, spot, in bulk.	@ 11 00
		Do, in sacks.	@ 13 00

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		AMOUNT.		SECRETARY AND OFFICE IN S. F.	
Andes M Co, Nevada.	35.00	March 8, April 11, April 23.	J W Twigg, 309 Montgomery		
Best & Belcher M Co, Nevada.	51.00	March 3, April 7, April 23.	L Caborn, 349 Montgomery		
Belcher M Co, Nevada.	43.00	March 8, April 16, May 3.	C L Perkins, 331 Pine		
Butte Queen M Co, California.	2.00	Jan 26, Feb 27, Mar 28.	V Gadesden, 119 Bush		
Cal Verde Antique Marble Co, California.	2.00	Feb 2, Mar 7, Mar 28.	W J Gunnert, 348 Pine		
Cal Verde Marble Co, Nevada.	1.00	March 10, April 12, May 5.	E Elliot, 309 Montgomery		
Croft Point M Co, Nevada.	57.00	March 15, April 19, May 10.	J Newlands, 331 Pine		
Full River Con G M Co, California.	7.00	Feb 24, April 2, April 25.	L Cassel, 115 Front		
Golden Piece Gravel M Co, California.	16.00	Jan 30, Mar 24, May 7.	W J Gleason, Puelan Block		
Golden Prize Con M Co, Nevada.	5.00	Feb 23, April 2, April 23.	C D Bennett		
Guadalupe and California M Co, B C.	6.00	Feb 9, Mar 15, Apr 5.	E Oliver, 22 Mint Ave		
Head Centre and Tranquility Co, Arizona.	4.00	March 14, April 19, May 12.	J W Pew, 310 Pine		
Keystone Con M Co, California.	2.00	March 9, April 19, May 9.	J H Isbarn, 310 Pine		
Los Gatos Lime Co, California.	2.00	Jan 11, Feb 23, March 25.	WS Somerville, 323 Montgomery		
Middle Creek G Co, British Columbia.	2.00	Jan 16, Feb 23, Mar 28.	H D Hawks, 318 Pine		
North End M Co, Nevada.	19.00	March 1, April 5, May 3.	J W Pew, 310 Pine		
Original Keystone M Co, Nevada.	9.00	March 4, April 14, May 7.	F E Lutz, 330 Pine		
Overman M Co, Nevada.	63.00	Feb 10, Mar 16, Apr 6.	G D Edwards, 414 California		
Peer M Co, Arizona.	12.00	Feb 21, March 26, April 28.	A Waterman, 303 Montgomery		
Pine Hill M Co.	75.00	Feb 11, March 21, April 15.	Chas A Hare, Stuart St		
Quartz Hill M Co, Nevada.	75.00	Feb 2, Mar 8, Mar 28.	J B Holmes, 309 Montgomery		
Sierra Nevada M Co, Nevada.	101.00	Feb 1, Mar 4, Mar 24.	E L Parker, 309 Montgomery		
Utah Con M Co, Nevada.	14.00	March 8, April 11, April 29.	A H Fish, 309 Montgomery		
Weldon M Co, Arizona.	5.00	Feb 9, Mar 15, Apr 14.	A Waterman, 303 Montgomery		
Yellow Jack M Co, Nevada.	10.00	Feb 2, Mar 4, Apr 2.	W H Blauvelt, Gold Hill		

LATEST DIVIDENDS.

COMPANY AND LOCATION.		AMOUNT.		SECRETARY AND OFFICE IN S. F.	
Cones Cal & Virginia M Co, Nevada.	50.00	March 10, April 19, May 9.	J W Pew, 310 Pine		
Eureka Con M Co, Nevada.	50.00	March 10, April 19, May 9.	J W Pew, 310 Pine		
Great Western Silver M Co, Nevada.	10.00	March 10, April 19, May 9.	J W Pew, 310 Pine		
Pacific Coast Borax Co, California.	10.00	March 10, April 19, May 9.	J W Pew, 310 Pine		
Standard Con M Co, California.	10.00	March 10, April 19, May 9.	J W Pew, 310 Pine		

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb 25.	WEEK ENDING March 2.	WEEK ENDING March 9.	WEEK ENDING March 15.
Alpa.	35.00	30.35	35.00	30.35
Alta.	1.05	1.00	1.00	1.00
Andes.	1.05	1.20	1.00	1.20
Belcher.	25.00	20.25	25.00	20.25
Best & Belcher.	2.15	2.70	2.00	2.52
Bullion.	75.00	1.15	70.75	83.50
Bodie Con.	40.50	40.50	40.50	40.50
Bulwer.	15.00	20.15	15.00	20.15
Commonwealth.	1.10	5.00	1.10	4.50
Con. Va. & Cal.	1.10	5.00	1.10	4.50
Challenge.	75.00	1.00	80.95	95.80
Crocker.	1.30	1.75	1.10	1.35
Confidence.	2.25	2.50	2.10	2.40
Con. Imperial.	0.05	1.00	0.05	1.00
Caledonia.	20.25	20.25	20.25	20.25
Crown Point.	0.05	1.20	0.05	1.00
Crocker.	0.05	1.00	0.05	1.00
Del Norte.	50.00	40.45	35.00	45.00
Eureka Con.	1.75	1.55	1.85	2.00
Exchequer.	15.40	35.40	35.40	35.40
Grand Prize.	1.20	1.60	1.25	1.40
Gold & Curry.	1.20	1.60	1.25	1.40
Hale & Norcross.	2.05	2.10	1.70	2.10
Julia.	10.00	10.00	10.00	10.00
Justice.	35.50	35.40	35.40	35.40
Kentuck.	15.15	15.15	15.15	15.15
Lady Wash.	20.20	20.20	20.20	20.20
Mono.	95.10	80.85	85.10	75.85
Mexico.	1.65	1.95	1.60	1.80
Nevada.	0.05	1.00	0.05	1.00
North Belle Isle.	0.10	0.10	0.10	0.10
Nev. Queen.	30.40	35.30	35.30	35.30
Overman.	40.50	40.50	40.50	40.50
Opbir.	2.60	2.85	2.50	3.05
Overman.	55.70	60.60	60.60	60.60
Potosi.	1.15	1.75	1.10	1.25
Pearless.	1.15	1.75	1.10	1.25
Pear.	1.15	1.75	1.10	1.25
Savage.	1.10	1.35	1.05	1.65
S. B. & M.	30.40	35.30	35.30	35.30
Sierra Nevada.	1.30	1.55	1.35	1.70
Union Con.	1.30	1.70	1.35	1.70
Scorpion.	20.15	20.15	20.15	20.15
Union Con.	1.30	1.70	1.35	1.70
Yellow.	30.30	30.25	30.25	30.25
Utah.	75.95	65.70	1.30	1.30
Assessment added				

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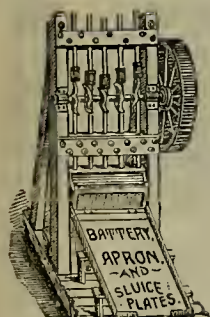
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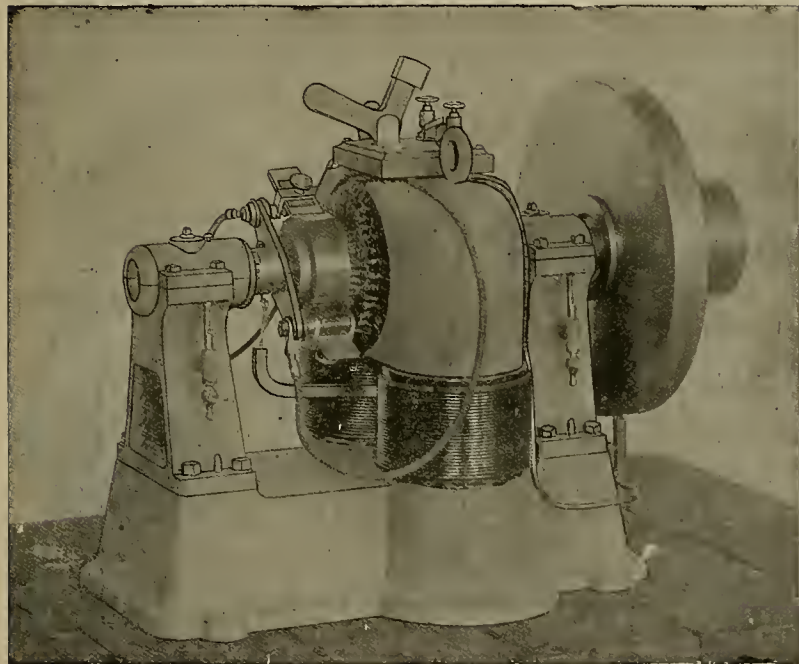
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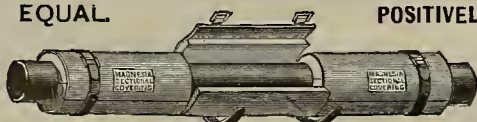
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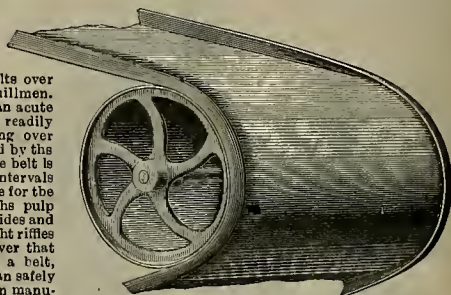
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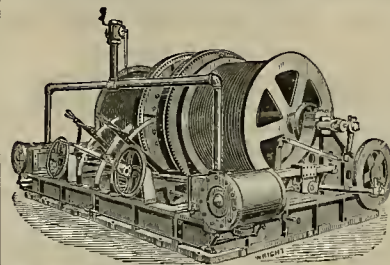
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COMMON SENSE PULVERIZER AND CONCENTRATOR.

This is the Most Successful Machine yet discovered for working gravel, cement, clay, etc. It avoids crushing the rocks, which are washed clean, while at the same time it pulverizes the CEMENT or CLAY, and

SAVES THE GOLD ALTHOUGH IT IS AS FINE AS FLOUR.

It is only necessary to have from four to six inches of water to work 100 tons or more every 24 hours.

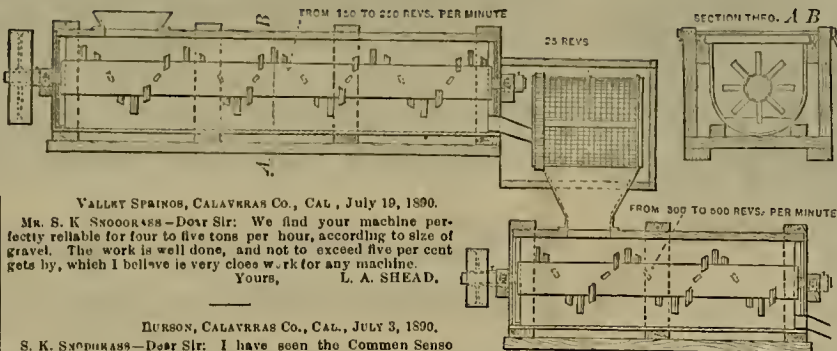
The machinery consists of two iron troughs or "concaves," each 20 inches in diameter, one of which is about 18 and the other 12 feet long.

In these troughs are strong revolving shafts with projecting teeth, made of steel, two inches wide by three-quarters of an inch thick, placed in spiral form around the shaft, about two inches apart, forming a conveyor.

The first shaft is arranged to revolve from 150 to 250 revolutions per minute, and the second one from 300 to 500.

There is a revolving screen between the two troughs that takes out the coarser rocks after being washed, and only the finer material runs into the second trough, and is there worked thoroughly.

There is a space of about four inches in the bottom of each trough, or "concave," that fills up with gravel and sand. When the gold is freed it settles into this, and as the teeth do not disturb the bottom, the gold remains there until a cleanup is made.



VALLEY SPRINGS, CALAVERAS CO., CAL., July 19, 1890.
Mr. S. K. SNODGRASS—Dear Sir: We find your machine perfectly reliable for four to five tons per hour, according to size of gravel. The work is well done, and not to exceed five per cent gets by, which I believe is very close work for any machine.
Yours,
L. A. SHEAD.

DURSON, CALAVERAS CO., CAL., July 3, 1890.
S. K. SNODGRASS—Dear Sir: I have seen the Common Sense Pulverizer and Concentrator in operation, and will say that for all kinds of gravel and clay it is the best machine I have ever seen.
Yours respectfully,
A. J. KNAPP.

PLACERVILLE, CAL., July 15, 1890.
S. K. SNODGRASS—Dear Sir: I have worked with your machine in two counties, and have never seen the equal of it for washing gravel or saving fine gold. I have helped to clean up and found fine flour gold. I have put through it at the rate of 100 tons and over per day, and have also prospected the tailings thoroughly and found no gold in them. I have talked with other parties who have worked with them and say they are a good machine. Have been mining over 25 years.
Very respectfully,
D. G. HUGHES.

VALLEY SPRINGS, CAL., June 30, 1890.
S. K. SNODGRASS—Dear Sir: I have seen the working of the Common Sense Pulverizer and Concentrator in clay and all kinds of cement, and have examined the tailings, and will state that I have never seen work done by any machine that compares with it. I have seen it when working from 100 to 150 tons per day, and been present when cleanings were made, and seen gold as fine as flour. I would recommend it for using in any kind of placer mining. I have been mining for 20 years.
Yours,
J. D. COOK.

SAN FRANCISCO, March 25, 1891.
S. K. SNODGRASS, Esq.—Dear Sir: In regard to the work done by your machine, which we have had in operation for the past three months, I can say that it has handled successfully all material as taken out of our ground, the only cement which was not perfectly broken up being an exceedingly hard cemented material approaching rock in its hardness.

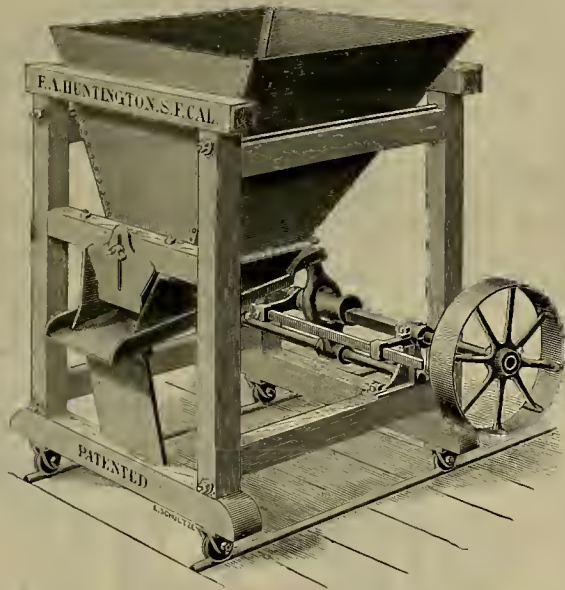
For all free wash and moderately hard cement it will do very good work, and must effect a great saving in working such gravels and cements, owing to the small head of water required; and furthermore, its great gold-saving qualities, as I am satisfied that fully 95 to 98 per cent of the gold freed in the machine is saved, even to flour gold, and that too without the use of quicksilver.

The automatic rejection of all rocks and material by the revolving screen makes the handling of the gravel cheaper, as all hand culling of the material is rendered unnecessary.
Yours truly,
W. W. B. STEVENS.

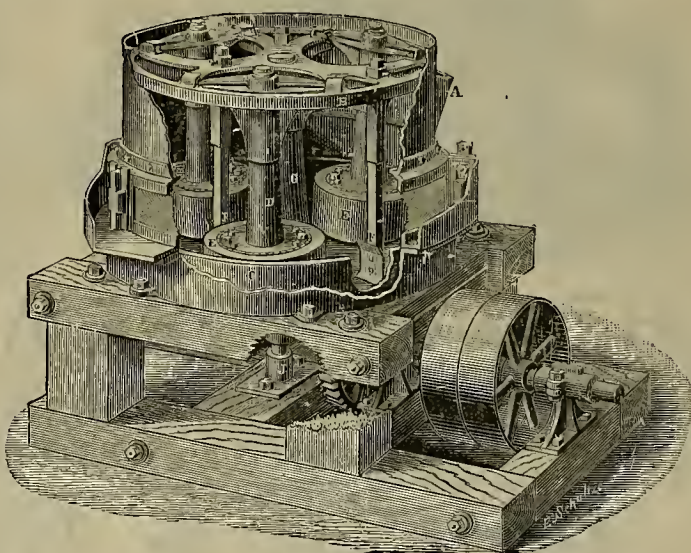
CHICO GULCH, CALAVERAS CO., CAL., July 10, 1891.
Mr. SNODGRASS—Dear Sir: I was down to Spring Valley looking at the machine and it runs very nice and a great deal better than I expected. If you can make them work as well as that one it is the finest machine in the country, and I examined it thoroughly. I have been around gravel mines for the last 30 years. Yours respectfully,
STEPHEN M. HUGHES.

S. K. SNODGRASS,
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The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

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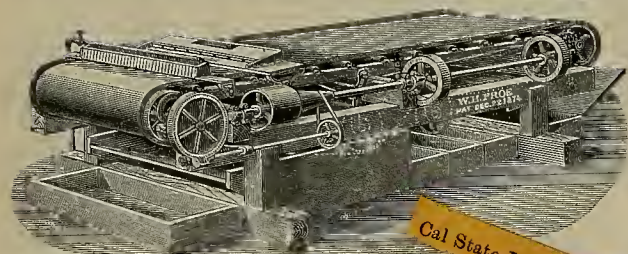
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OVER 3200 IN ACTUAL USE.

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 Office of General Manager,
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 CAJALCO, Dec 15, 1891.

MESSRS. ADAMS & CARTER, 132 Market Street, San Francisco, Cal.—GENTLEMEN: After a continuous trial of different concentrators comprising the Frue Vanner, the "Holland," "Paradox," "Triumph" and the "Woodbury" concentrators, extending over several months, we find that we prefer the Frue Vanner, as it is easier of adjustment, runs smoother, has less wear and tear, and—having a positive travel—gives less trouble than the other more complicated and ever changing machines now in use here. The Frue Vanner not only saves a cleaner concentrate, but has less loss in the tailings, and is in several ways preferable to the other concentrators here.
 I am, my Dear Sirs, Yours faithfully,
 S. HARRIS, Manager.

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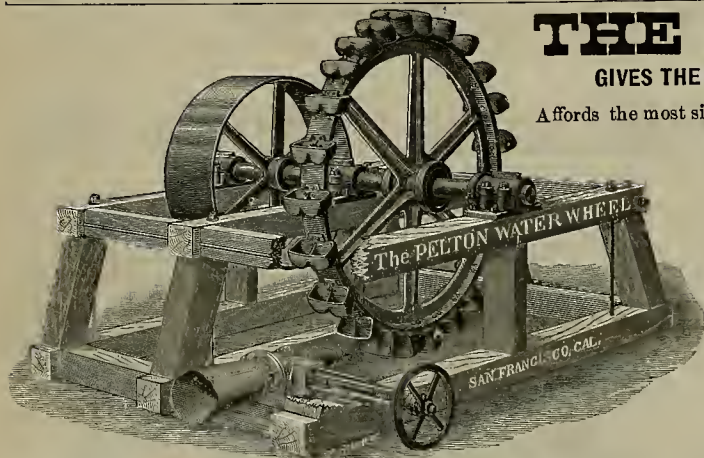
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UNLIMITED IN CAPACITY. UNEQUALLED IN EFFICIENCY, UPWARD OF 3,000 NOW IN USE. Will do more than twice the work of any other with the same cost in wear. Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

It having come to the notice of the undersigned that their patent rights are being infringed upon, intending purchasers are hereby warned that all such infringements will be duly prosecuted. (Signed) THE PELTON WATER WHEEL CO.

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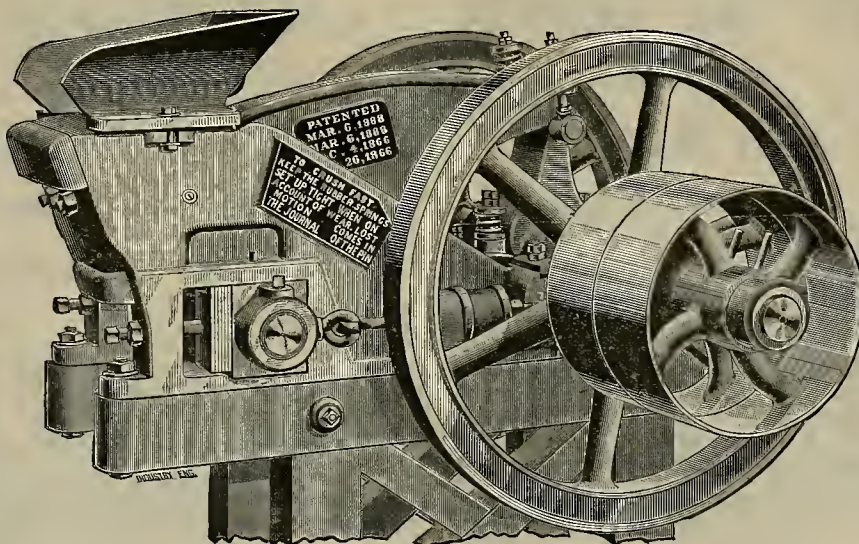
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV.—Number 13.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MARCH 26, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

A New Cooking Utensil.

George W. Merk of 560 Howard street, this city, has obtained through the Mining and Scientific Press Patent Agency a patent on a novel cooking utensil which is applicable for various purposes. The lower vessel of the utensil has a central open tube, provided at its upper end with a removable cover. Upon one side of this lower vessel is a spout from which the water may be poured. This spout is a little lower than the

Splicing Wire Ropes.

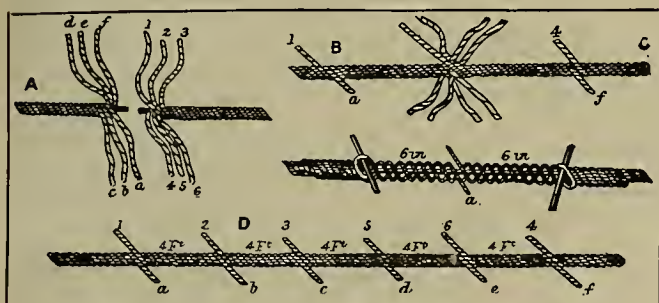
As it is often necessary to effect a splice in wire ropes in and around mines, it will be well to reproduce the excellent directions given by Roebbling, a well-known American maker. The tools needed are: Pair of nippers for cutting off ends of strands; pair of pliers for pulling through and straightening ends of strands; point to open strands; knife to cut core; wooden mallet, and two rope nippers with sticks to untwist the rope. In

passing each other at points four feet apart, as in *D*, 4, to secure and dispose of the ends without increasing the diameter of the rope, nipper two rope slings around the wire rope, say six inches on each side of the crossing point of two strands; insert a stick through the loop, and twist them in opposite directions, thus opening the lay of the rope *E*; next cut the core six inches on the left, and stick the end of 1 under *a* into the place occupied by the core; then cut the core in the same way on the right, and stick the end of

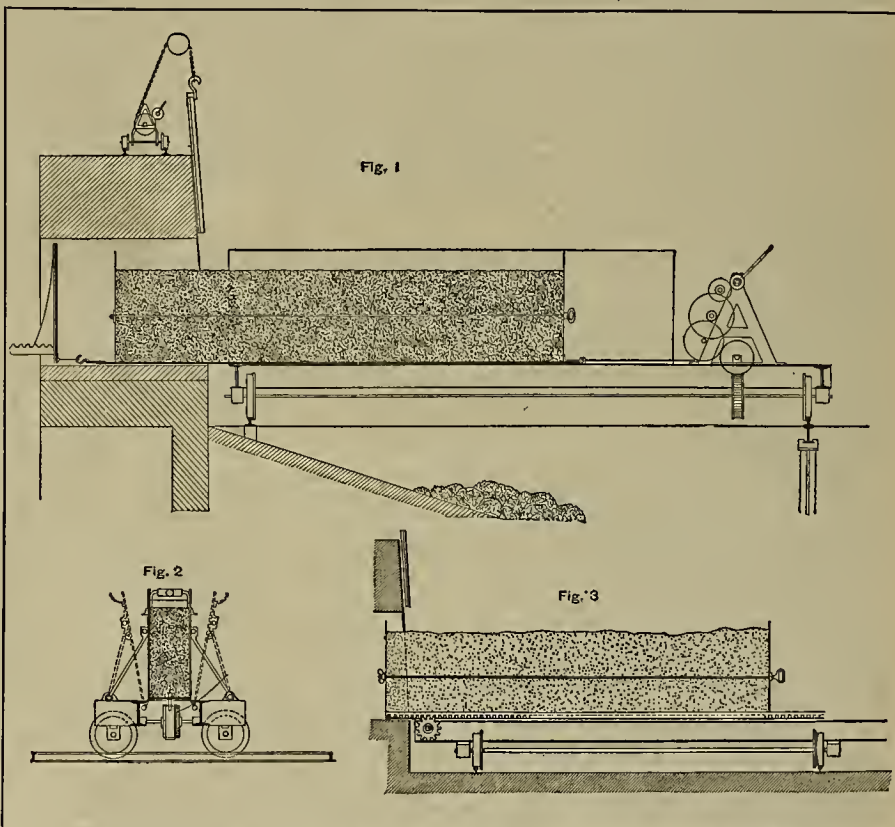
hesive coke. To this end many means have been proposed and tried. The attempt has been made, without practical success, to press the coal together in the coke oven. Again, the coal has been made into bricks, which, by reason of their regular shape, could be packed tightly together in the oven; but this practice also has failed of general adoption. Finally, resort has been had to the method of sampling the coal in a box, and charging into the oven the whole of the thick slab thus produced. This pro-



MERK'S COOKING UTENSIL.



METHOD OF SPLICING WIRE MINING ROPES.



APPARATUS FOR CHARGING FINE, STAMPED COAL INTO COKE-OVENS.

top and prevents the vessel being filled so full that it will overflow into the central tube. The utensil may be used either upon the top of a stove or range, or a cover of the range may be removed so that the heat will pass directly up the tube. When it is desired to use the device as a steamer, the upper chamber or vessel is employed, and this is fitted into the top of the lower vessel when the cover has been removed. When in place, the extension covers the entrance to the spout to prevent escape of steam. This upper vessel has also a central tube, open at bottom and top, and connecting with the lower tube.

Heat may thus be admitted to the bottom of the steam cooker or steam may be admitted from below as desired. The arrangement is such that food is prevented from getting "soggy," as is apt to be the case in steam cookers. The main lower vessel can be used alone as a teakettle when required. The utensil is adapted for gas or oil stoves, as well as for ordinary ranges.

operating, 1, heave the two ends taut, with block and fall, till they overlap each other about 20 feet; open the strands of both ends for 10 feet; cut both hemp cores as closely as possible, and bring the open bunches of strands face to face, so that the opposite strands interlock regularly. 2, unlay any strand *a* (see cuts) and follow up with strand 1 of the other end, laying it tightly into the open groove left upon unwinding *a*, and make the twist of the strand agree exactly with the lay of the open groove, until all but about six inches of 1 are laid in, and *a* has become 20 feet long; cut off *a* within six inches of the rope *B*, leaving two short ends, which must be temporarily tied. 3, unlay a strand 4 of the opposite end, and follow up with the strand *f*, laying it in the open groove as before, and treating it precisely as the first *C*; pursue the same course with *b* and 2, stopping however within four feet of the first set; then with *c* and 5, *c* and 3, and *d* and 4; thus all the strands are laid in each other's places, with the respective ends

a in the place of the core, the ends of the strands being straightened before they are stuck in; loosen the rope nippers, and let the wire rope close; a wooden mallet will beat out any slight inequalities remaining. Repeat the operations in the other five places.

Preparing Coking Coal.

The difficulty with German coking coals is usually to be found not so much in an excess of ash as in the lack of "coking quality," even when the ash is low. So far as the ash is concerned, an adequate remedy has been found in careful crushing after sizing. There is claimed to be a decided advantage in crushing coal before coking in the more intimate contact of particles thus secured. Experience has shown that the smaller the quantity of heavy hydrocarbons in the coal (these being the well-known determinants of its coking quality) the closer must the solid particles be brought together in order to form a co-

cedure has given satisfaction in German works, and is now in somewhat extensive use. The apparatus shown in Figs. 1, 2 and 3, from the German Imperial patent of J. Quaglio, No. 36,097, is used especially by Upper Silesian coke-makers, who everywhere stamp by hand. The cuts are self-explanatory. We have not many coking coals on this coast; what there are come from the Puget Sound section. Possibly, with an apparatus of this sort, coke might be made from other coals lacking the proper "coking quality."

WHEN the news reached Bodie that Joe Ryan had been appointed superintendent of the Hale & Norcross, it seemed to the people as much satisfaction as if a free coinage bill had been passed by Congress. Mr. Ryan was for a short time superintendent of the Bodie tunnel and made a very favorable impression on our people, and they all now rejoice at his good fortune.—Bodie Miner,

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ed.

Gaylussite.

On a New Variety from San Bernardino County.

SAN FRANCISCO, March 19, 1892.

TO THE EDITOR:—The alkaline lakes, sales and the mineral springs of California and Nevada have long been objects of interest, not only to the people of the Pacific Coast, but to the world generally, from an economic standpoint because of the large output of borax and borax minerals, and from a scientific one for the interesting features they present to the geologist, the chemist and the general scientific observer.

These are great chemical laboratories in which nature is now employed in transforming one class of minerals into others. In sedimentary rocks deposited so long ago that the period cannot be stated, containing minerals in which all affinities were satisfied, a slow setting free of imprisoned elements has at last produced a condition of heterogeneity, with new affinities, resulting in the production of new compounds and chemical energy manifested by heat, which in other lands, on a larger scale and more highly intensified, has culminated in volcanic eruptions.

The same phenomena in miniature have been recently observed in my laboratory. I have a tank filled with water in which I make frequent washings of pulverized ores and minerals to obtain concentrations for examination. I have often noticed on the surface of the water, bubbles of escaping gases resulting from the heterogeneous minerals which have settled on the bottom, seeking new affinities and mutually decomposing each other.

On one occasion, I allowed the water to flow out very gently without disturbing the deposit, which I found to have changed from the heavy sediments one would expect to find, and assumed the form of a light porous matter showing signs of fermentation.

To elucidate more fully what I have stated, I call special attention to the mud volcanoes on the sedimentary plains of the Colorado desert, San Diego county; the so-called geysers of Sonoma county; the thermal alkaline mineral springs, gas emanations, sulphur lakes and mercury sublimates of Colusa county; the great gas fountain in Clear Lake, Borax Lake and the hot ammoniacal spring in Lake county; the natural gas flowing from deep wells in San Joaquin county, and similar phenomena at sundry other localities.

I send you this communication to lay before your readers the result of an investigation and study of amorphous gaylussite—a rare variety brought to me from the borax fields of the San Bernardino Borax Mining Co. by Mr. J. W. Searles, which has a special bearing on this very interesting subject.

I found it to be a confused semicrystalline mass, but there are no distinct or defined crystals—none that resemble the semiopaque ones found so profusely in the numerous alkaline lakes of California and Nevada.

Under the microscope, some woody fragments were garnished by clusters of attached crystals, just as gaylussite forms in alkaline lakes on floating twigs. This peculiarity was very marked. Occasionally, an imbedded crystal shows a few facets imperfectly defined.

The mineral has the following physical properties: It is only partly soluble in water, but is almost wholly so with brisk effervescence in acids. It is soft (hardness 2); the hardness of the crystals generally found is sometimes 3; easily crushed; hygroscopic; the acid solution neutralized with ammonia gives a heavy precipitate with oxalate of ammonia.

It shows evidences of having been deposited in strata by successive stages. At first I thought it might be a mechanical mixture of lime and soda carbonates, but the microscope shows that it is not. In platinum forceps it is very fusible, colors the flame intensely yellow, evolves the lime light; in closed tube gives much water; at full red heat in a platinum dish it first parts with its water and then fuses perfectly with effervescence; on increasing the heat, it separates into two parts—one, A, is very fluid and the other, B, is solid.

Portion A is wholly soluble in water, does not effervesce with acids, nor react for lime, is strongly alkaline; the evaporated solution leaves a white fusible residue.

Portion B nearly all dissolves in hydrochloric acid, without effervescence, and gives the lime reactions.

I have not been able to find any published notice of gaylussite other than crys-

tallized, nor have I before seen a specimen of the amorphous mineral.

Gaylussite in crystals was first discovered by Boussingault in a soda lake at Lagunilla, near Merida, Columbia, in a bed of clay. It contains one equivalent of carbonate of soda, one of carbonate of lime, and six of water. The original analysis by Boussingault was:

Carbonate of soda.....	34.5
Carbonate of lime.....	33.6
Water.....	30.4
Clay.....	1.5
	100.0

Thinolite is an impure carbonate of lime, found on the margin of alkaline lakes in California and Nevada. It was so called by Clarence King, United States Geologist, in 1876, from a Greek word meaning a shore, a name suggested by the common locality. It was published in the first volume of the United States geological exploration of the 40th parallel, folio 508. In the same volume (folio 517) he advances the opinion that it is a pseudomorph of calcite after gaylussite, and he refers to the mineral as being crystallized. He says (folio 518) it is gaylussite; "thinolite is therefore practically, leaving out impurity, a pseudomorph of carbonate of lime after gaylussite"—"pseudo gaylussite;" here some peculiar specimens are beautifully figured. He theorizes as to the formation of thinolite, and thinks lime is added to a saturated solution of sesquicarbonate of soda.

It is my opinion that two constituents of gaylussite are formed at the same time, and perhaps, by a single operation. I am led to this opinion by the signs of stratification in the specimens I have examined; I think further that thinolite is the result of subsequent leaching out of the carbonate of soda, which becomes soluble gradually and naturally—an operation I so quickly performed in the platinum dish; I believe also that the lime and soda which combine with the carbonic acid and water to form gaylussite, are both derived from the abundant eruptive rocks in all of which they are material constituents. Analysis shows that basalt contains from 8 to 10.56 per cent of lime; diorite 4 per cent; andesite from 4 to 9 per cent, and granite 0.69 to 3.06 per cent.

When I began to consider this, my mind reverted to what I had observed at two very interesting localities; one, the mud volcanoes on the Colorado desert—described in the second report of the State Mineralogist, 1880, fol. 227, where "inverted stalactites" of carbonate of lime were forming, and the other, the flanks of Sentinel Hill, near Tucson, Arizona, where the so-called plutonic rocks were seeping water that deposited a calcareous tufa which was spread over the loose detritus of the talus for miles and miles.

The cause of limestones alternating, or being in juxtaposition with the eruptive rocks, has been a perplexing problem with geologists, and none seem to have surmised that the lime resulted from the metamorphism of the eruptive rocks themselves. The formation of limestone tufas near Sentinel Hill is now in active operation, as it is at the mud volcanoes mentioned.

I have been familiar with thinolite since 1862, 16 years before it was described by Clarence King, and have studied it in its varied forms at many localities in California and Nevada; it is burned for lime where none other can be procured.

When I first saw it on the shores of Mono and Owen's lakes, and in the ancient beds of others long since vanished—their departure having been caused by climatic alteration, change of levels, or by the accidental removal of natural barriers—I believed it to be fossil coral.

I conceived the idea that thinolite was a pseudomorph long before I read Mr. King's description, but I could not reconcile the difficulty of massive thinolite being formed from small individual crystals, the only form of gaylussite I was familiar with. This variety seems to be the missing link which may exist in large quantity, and may have been overlooked. It much resembles amorphous thinolite. If the soda were wholly leached out the remaining mineral would be porous, just as thinolite is sometimes known to be, and if distorted by pressure or other cause, it might assume some of the fantastic forms peculiar to that mineral.

HENRY G. HANKS.

ANTI FRICTION BEARINGS.—The metal of the well-known patent Magnolia anti-friction bearings has been found by analysis to have the following composition: Lead, 80 pounds; antimony, 15 pounds; tin, 5 pounds; bismuth, 4 ounces; graphite, 8 ounces; aluminum, 4 ounces.

REPORT has it that Hathaway mine, near Ophir, Placer Co., is soon to change hands and that under the new managers its operating force will be increased.

The Cyanide Process.

The MacArthur-Forrest System of Gold Extraction.

In order to understand the present systems of gold extraction, to properly appreciate the work already done, and to gauge the difficulties to be surmounted, it is necessary for us to look back and trace the connection between the known forms of gold as found in nature and the methods used to separate it from its base environments.

In the earliest ages gold would naturally only be found in nuggets and grains (our word *carat* is derived from a Persian word meaning a grain), which required no means of separation beyond picking up—happy age when gold had only to be picked up!

From grains the ancient would come down to gold dust, and this was no doubt separated from the sand or earthy matter with which it was associated, by the skillful use of air currents which were caused to blow away the sand, leaving the precious metallic dust. This method is still practiced in Arabia and the East. Wherever water was plentiful it was found that it did the required separation better and more economically than air, a method of separation which has been and still is in use everywhere all over the world. The prospector, digger, explorer, and even the tourist nowadays provides himself with a "pan" in which to wash a sample of "dirt" at the nearest stream. From the pan comes the "cradle," "long tom," and the innumerable mechanical arrangements for the separation of gold from earthy matters. Up to this point we have only mechanical means of separation which depend on the high specific gravity of gold compared with sand, clay, etc., but at this stage in the evolution of gold extraction we find the first move made toward a chemical method. When there was a lot of rich dirt in his pan the digger found it very difficult to wash away the last of the sand without losing a large proportion of the finely divided gold, so he hit on the expedient of pouring in a little mercury, which formed a heavy, massive, though fluid alloy with the gold, making the separation of the last portions of the light granular sand a very easy matter. This plan is still in world-wide use alike by the solitary digger who lives in a lonely canyon, and by the well-organized company that "hydraulics" 1000 tons of "pay dirt" per day. Let us now look at the

PRESENT STATE OF THE GOLD INDUSTRY.

Let us imagine a digger who has exhausted all the gravel and pay dirt in the canyon or gully; he travels up the gully looking to the right hand and to the left for traces of the precious metal; occasionally he finds a piece of gold-bearing rock and is led on and on till he finds the source of these auriferous stones to be a reef. Now begins gold-mining proper. A shaft is sunk on the reef or a tunnel driven into it and great masses of rock are brought to the surface, and naturally the miner is led to imitate nature by crushing this rock to a fine sand and then he modifies the treatment, formerly given to alluvial deposits, to adapt it to the new circumstances. The ore, immediately on being crushed to powder (which is generally done by huge gravitation stamps), is carried over an amalgamated copper plate by a stream of water. In passing over the amalgamated plate the gold is caught by the mercury, while the sand, now called tailings, is washed off. The gold is recovered by scraping the amalgam off the copper plate at stated intervals, generally once a month, when by distillation the mercury is recovered as well as the gold separated. If all the gold the ore contained existed in the heavy metallic form, the recovery by this method would be complete and the loss nil; but the tailings are frequently found to contain a little gold, and on close examination particles of pyrites and sulphides of the various base metals are found diffused through the mass. When these metalliferous particles are separated from the mass of tailings, it is found that they principally contain the gold, so that it is now usual in practice to pass the tailings through some form of concentrating machinery, of which the well-known *Frue vanner* is a good example, whereby the pyrites and other sulphides are retained in virtue of their higher specific gravity and the sand washed away. The rich proportion now called "concentrates" may contain up to 20 ounces of gold per ton, though four or five ounces is much nearer the average figure.

IF THE CONCENTRATES ARE EXAMINED

Closely, even microscopically, no free gold can be distinguished, and if they be treated with mercury, they will yield to it little or none of their gold contents. Sometimes a considerable portion of gold may be got from them by a long-continued grinding in cast iron pans in presence of mercury. This grinding seems to force the sulphur and base metals, as well as the gold, into com-

bination with the mercury, so that the bullion got from the amalgam often contains over 95 per cent of copper, lead and other base metals, while there is a corresponding loss of mercury which is carried away partly as sulphide and partly in a "floured state." The flouring is caused by the small globules of mercury being coated with a film of sulphide of mercury, which prevents the particles coalescing. Thus there is a double loss—chemical, by the formation of sulphide of mercury, and mechanical, by flouring. This loss is so well known that concentrates are only treated by this form of amalgamation in localities where nature forbids any more elaborate process. Sometimes the amount of loss may be lessened by roasting the concentrates before amalgamation, but this is by no means a perfect remedy, as the roasting removes only volatile constituents of the concentrates, principally sulphur, while the base metals—lead, zinc, etc., are left in the form of oxide to oxidize and waste their equivalent of mercury. Attempts have also been made to decrease the loss of mercury and increase the yield of gold by adding to the contents of the pan all sorts of chemicals to "doctor" the "sickened"—that is, floured mercury. These chemicals are generally mixtures of sulphate of iron, sulphate of copper, salt, lime, soda, etc. This kind of "doctoring" may be effective in some cases, but it is seldom practiced with intelligence. Where the percentage of concentrates is limited, and where there are a number of mines, it is common for some enterprising man to set up a smelting or chlorination work which is made large enough to deal with the concentrates of the district. I will not take time to describe the various processes of smelting, nor could it be done at any evening sederunt; but we may bear in mind that all smelting processes end in alloying the gold with lead, and cupelling in the usual way, with which we are all familiar. Because of the obvious impracticability of smelting, requiring well-built brick furnaces, coal, fluxes, etc., at the typical gold mine high up on the mountain range, possibly near or beyond the timber line, chlorination is much more commonly practiced and consequently merits a full description. In giving this description, I will confine myself chiefly to the old standard Plattner process as I have seen it practiced in California, where timber is abundant and cheap.

THE FIRST AND ESSENTIAL OPERATION

Prior to chlorination proper is roasting. It is obvious that a mixture of sulphides and arsenides of iron, copper, lead, zinc and metals generally will absorb an almost unlimited amount of chlorine, so that the small proportion of gold present would fare badly in a general scramble of the molecules for chlorine. That the metals may have the least opportunity to combine with chlorine, the sulphur is expelled, and their affinities satisfied as far as possible with oxygen by roasting. The roasting is generally done in a large reverberatory furnace, that has no very noteworthy feature in its construction. The concentrates are charged into the furnace at the cold end, heated very gradually, continually stirred and slowly worked forward into the hottest part, care being taken to admit air freely during the whole operation. Where chlorination is practiced on the most extensive scale, this roasting generally takes about 24 hours, and consumes from a minimum of half a cord to a cord of wood per ton, roasted. (A cord of wood gives about as much heat as a ton of coal.) It is a common saying that the success of chlorination depends more on the furnace-man than on the chlorinator, and on looking into hard chemical facts, we find that this is really the case, for if only one-half per cent of iron were left unoxidized it would absorb nearly one per cent of chlorine, equal to about three per cent of bleaching powder, and all this before the gold gets a single molecule of chlorine. Toward the end of the roasting, and about 15 or 30 minutes before the ore is discharged from the furnace, it is usual to stir in a small proportion of common salt. The object of this is to satisfy with chlorine, as far as possible, copper, zinc and other metals whose oxides have a tendency to form chlorides when they get chloride presented to them in the free state. This chloridizing device is, however, only partially effective, as the chlorides formed are apt to be immediately decomposed under the influence of hot air, and in the case of lead, the oxide of sulphur will not combine with chlorine in the furnace, but combines with it readily when offered moist and at the ordinary atmosphere temperature.

THE ROASTED AND OXIDIZED ORE

Is now sprinkled with water to make it slightly moist, and is then charged into a wooden vat having a perforated false bottom. The chlorine, generated at an outside

source, is led in between the true and false bottom, and gradually permeates upward through the mass of the porous ore. The small amount of water held by the ore then becomes a saturated solution of chlorine, which gradually acts on the gold, so that in the course of one or two days it may be washed out as the soluble chloride by a further amount of water. This weak solution of chloride of gold is run into a tank, a solution of ferrous sulphate added, precipitate of gold allowed to settle for 48 hours, if possible, and the supernatant solution allowed to flow off. When sufficient gold precipitate has accumulated, it is collected and run into bars. Besides the Plattner form of chlorination which I have described, there are others which vary from Plattner and among themselves in the manner of application of the chlorine—most of them using revolving barrels instead of open vats for the chlorination proper. The best known of these are:

The Meier's process, where chlorine is used under its own gaseous pressure.

The Newbery-Vautin, where air pressure is used.

The Pollok, recently described before this section of the society, where hydraulic pressure is used, and the Thies, where the chlorination is done in a barrel without any pressure, as described in this journal, 1889, 895.

Let us now return to the mine. The deeper we sink down into the reef, we find that while the richness of the ore may remain constant, the proportion of free gold, that is, amalgamable gold, becomes smaller and smaller, while the proportion of gold-bearing sulphides becomes greater and greater till we come to the water level, where it often happens that the free gold leaves entirely and becomes wholly refractory—that is, nonamalgamable. The water level is generally regarded as the point where the atmospheric and weather influences cease, and that down to that point the rain water has penetrated and gradually washed away the oxidizable base metals, leaving the inert gold in the crevices of the equally inert quartz, whereas, the ore found below the water level, not having been subjected to oxidizing influences, retains all its metals untouched and unchanged.

AN INTERESTING PROBLEM

Now presents itself: An ore consisting of a complex mixture of silica and the various compounds of iron, copper, lead, zinc, antimony, arsenic and sulphur (for convenience I will include all these compounds under the general term sulphides) and gold in the proportion of 10,000 parts of silica and sulphides to one part of gold, is very much richer than the average auriferous ore, and the question is, how can we best separate the one from the ten thousand? Under favorable circumstances, the gold and the useful metals may be recovered by smelting, but these favorable circumstances, which are proximity of the gold mine to coal, clay, limestone and other fluxes, are quite exceptional, as auriferous reefs are generally found in primary formations. As before implied, chlorination is frequently inapplicable—no attempt is ever made to chlorinate gold ore containing an appreciable quantity of lead—and where applicable is always troublesome and never cheap. When this question presented itself to Dr. Forrest and myself, we tried to find some solvent which, unlike chlorine and mercury, would have a stronger affinity for gold than for sulphides. Acting on this principle, we drew out a list of all probable or possible solvents fulfilling this condition. This list included cyanides, and we found that these salts solved the problem.

THE EXPERIMENTS.

Our experiments were conducted first on a small scale, and on ores of all kinds and from all mines in all parts of the world. The result of these small trials was so satisfactory that we gradually worked from less to more, and in no long time larger quantities were worked, and now the process is in or on the eve of being put in operation in all quarters of the globe. I have now much pleasure in describing the method of working most generally applicable. The ore is ground to about the fineness of sea sand. If, instead of ore, we are working tailings from the amalgamation process, these are generally not to reground, but treated as delivered. The finely divided material is mixed with a solution of a cyanide, say cyanide of potassium, containing on an average 0.4 per cent of cyanogen as the cyanide of potassium or other alkali or alkaline earth. The ore and solution are stirred together for about six hours, more or less, this being the average time required to dissolve the gold; in practice the time required is determined by direct experiment. When the gold is known to be dissolved, the pulp is discharged into an ordinary filtering tank, where the filtration may if necessary, be

assisted by suction, and where the ore is washed by water or by the waste cyanide solution from a previous operation. The ore, after treatment with cyanide solution, is unchanged to the eye, as almost nothing but the imperceptible proportion of gold present has been removed. The gold now being in solution, the next object is to get it precipitated, and here we encounter a serious difficulty. Gold and cyanogen have such a strong mutual affinity, that it is difficult to get any substance that will separate them. The gold cannot be precipitated by any ordinary method, such as the use of ferrous sulphate or oxalic acid; even sulphureted hydrogen and sulphide of sodium will not precipitate gold from its cyanide solution, though they precipitate silver. On referring to books on electro-gilding, we got no assistance, as the invariable method given for the recovery of gold from cyanide solutions was, evaporate to dryness and fuse the residue. We had noticed, however, by experiment, that zinc precipitated gold very feebly, and tried this in the same way that copper is precipitated from its ordinary solutions by scrap iron, but scrap zinc had no effect; then granulated zinc was tried; with a most imperfect and disappointing result; then heating in presence of scrap and granulated zinc, but this had only the effect of forming urea, and assisting the precipitation very little indeed. Further, we tried zinc dust, but still there was no success; finally, we prepared some zinc in a form like sawdust, porous and with a large surface of bright metal. On allowing the cyanide of gold solution to trickle through a mass of the zinc, we found that it trickled out gold-free, and better still, we found that the action became more vigorous and pronounced after a portion of the gold had been precipitated on it, doubtless as gold and zinc formed together a more powerful electrochemical precipitant than zinc by itself. An arrangement of a porous mass of zinc like a sponge formed a chemical filter, which at once precipitated and collected the precious metal; indeed, so like an ordinary water-purifying device was this zinc filter, that many nontechnical visitors formed and held tenaciously to the idea that the gold was in suspension in the cyanide solution, and the zinc was used merely because of its durability.

IMPROVEMENTS IN DETAIL.

Were made in the direction of increasing the surface and decreasing the weight of the zinc, till now we have it in threads, 1 lb. of which occupies about two gallons measure. The zinc in this form is possessed of enormous chemical activity, of which the strongest and most direct evidence is the fact that it burns in the air like thin shavings of wood. When the gold has been deposited, it is necessary to separate it from the excess of zinc present. The filiform structure of the zinc, and the exceedingly fine powder, as which the gold is deposited, render this an easy matter. The filiform mass of zinc with gold powder adhering is vigorously shaken in water, when the gold falls off, and the fibrous particles of the zinc may be collected in a sieve. The gold settles easily, is collected, and fused directly into bullion.

Having now described the chief points in the process from the technical standpoint, let us look at the

PURELY CHEMICAL ASPECT

It presents. Reference has already been made to the fact that a cyanide solution acts on the gold in ores in preference to the sulphides of base metals with which it may be combined or associated; this selective action is the keystone of the whole process. It is known that metallic gold is dissolved by a cyanide; it is also known that sulphides of copper, zinc and iron artificially prepared are readily acted on by a cyanide solution; but we found a very different state of affairs in treating ores where these or similar compounds exist prepared by the hand of nature herself. Nature seems to render the base metallic compounds insoluble, while the gold combined with or contained in them is more easily acted on than the metal itself. This at once raises the question—how does gold exist in base refractory ores; is it combined or free? This question I admit I cannot answer satisfactorily to myself. Judging from theoretical considerations only, I think gold should exist almost invariably in the free state, for if we assume that sulphides, pyrites, etc., were formed by deposition from aqueous solution, the gold would be deposited in the metallic state. This may be shown by dropping some powdered pyrites into a solution of chloride of gold, when gold will be precipitated as metal; on the other hand, let us assume that the pyritous formations carrying gold were formed by igneous agency, in this case the gold ought to be metallic, too, because any sulphide of gold already existing would be decomposed

by the high temperature, and of course sulphide of gold cannot be formed at a high temperature. It is true that sulphide of gold may combine with any alkaline sulphide and resist decomposition by heat, but such a combination as a matter of fact does not occur in nature. Telluride of gold, and I think, antimonide of gold are not decomposed by heat, but they occur in small quantities only and do not affect the general argument. In spite of these theoretical considerations, however, we have strong evidence to show that gold exists in several different states of combination or molecular structure. Let me give

ONE CASE IN ILLUSTRATION.

A sample of tailings from the ordinary process of stamping and amalgamation was received, and I think it may safely be assumed that the mercury had extracted some gold from the ore which produced these tailings. We treated the finely ground tailings by alkaline solution of bromine which extracted a considerable portion of gold, and the bromine treatment was repeated time after time till it ceased to extract gold; then it was treated with a hot solution of ferric bromide which yielded a further quantity of gold. This treatment was repeated time after time till it ceased to extract gold, and finally the residue of tailings were smelted and a still further quantity of gold produced. As this ore yielded its gold in stages to the four different processes of amalgamation, treatment with bromine, treatment with ferric bromide and smelting, we infer that the gold existed in four different states, mechanical or chemical. Notwithstanding the complex nature of these tailings which consisted of all sorts of sulphides with the fourfold gold, the cyanide acted on it, almost perfectly extracting 93 per cent of the precious metal, whilst the higher extraction by any of the bromination methods was about 40 to 50 per cent. The cyanogen seemed to have an affinity for gold and a power of penetration so much stronger than mercury of bromine, that it broke through barriers impregnable to them and captured the gold. Elsner has stated metallic

GOLD DISSOLVES IN CYANIDE

Of potassium only in presence of oxygen. Not having seen the original account of Elsner's researches, I am not in the position to criticise his experiments, but I never could find that the presence of oxygen was necessary either to dissolve gold by itself or from ores by cyanide. If a piece of gold be immersed in a cyanide solution so that air to act on it would have to penetrate two inches or three inches of the solution, the gold will dissolve in its usual slow and steady fashion. The equation shows that either oxygen must be absorbed or hydrogen evolved. I have seen no evidence of the former, and can adduce no proof for the latter, but I think the latter the more probable, because I cannot conceive oxygen penetrating even a film of cyanide solution without at once oxidizing the cyanide to cyanate, whereas in the other case, as suggested to me by my friend Mr. Ellis, the nascent hydrogen may be at once seized by the excess of cyanide present and ammoniacal compounds formed. However, we do not concern ourselves much with the reactions of pure gold, but as a matter of fact we cannot find that oxygen plays any part in the cyanide extraction of gold from ores. We have treated an ore with cyanide with free access of air, and then a parallel experiment was done with boiled water, the bottle filled to the stopper with solution and ore, and the stopper sealed. The extraction was the same in both cases.

We have so far only considered ores which are refractory from chemical as well as mechanical causes, but ores are frequently found in which the gold is refractory from a purely mechanical cause, which is the extremely fine division of the gold. The cyanide process is quite as applicable to this class of ore as any other. These ores are generally spongy and absorbent, and this, we find, enables us to dispense with stirring the ore and cyanide solution together, the same end being accomplished by allowing this cyanide solution to percolate slowly through the mass—a clear saving in power.

THE ADVANTAGES CLAIMED

For the cyanide process over smelting and chlorination are: As compared with smelting, it requires no furnaces and no coal, and no fluxes, and thus may be used successfully in remote situations where smelting is utterly impossible. As compared with chlorination, cyanide process involves no roasting, therefore no furnaces and no fuel. Moreover, by the cyanide process, ores containing lead, zinc or earthy carbonates, which cannot be worked to profit by chlorination, may be easily and profitably treated as any other. For chlorination, about seven per

cent of the weight of the ore to be treated often has to be carried to the ore in the form of bleaching powder, say 1½ per cent, bisulphate of soda 2 per cent, and sulphate of iron 2½ per cent, with packing, say of 1 per cent, whereas about 1 per cent of the ore to be treated will cover the weight of the necessary cyanide, zinc and packing. Thus, by chlorination, one ton of chemicals will treat only about 14 tons, whereas by the cyanide method one ton will treat 100 tons.

Moreover, chlorination does not extract any silver, but by the cyanide method the most of the silver—invariably associated with gold in ore—is extracted along with the latter metal at the same operation. For the sake of simplicity, I have not named silver in the body of this paper, but the remarks made in reference to gold generally apply to the silver associated with it.

From what I have seen of gold mines and gold mining in the Sierra Nevada, in the Rocky Mountains, in the Southern States of America, in Nova Scotia, from the many kinds of ore I have seen from all parts of the world, and from what I know of the selective and energetic action of cyanides, I confidently predict that cyanide of potassium, hitherto used only to polish amalgamated plates, will take a front rank as chief agent in gold extraction.—J. S. MacArthur, in *Journal of the Society of Chemical Industry*.

UTAH NATURAL GAS.—Natural gas has been found near Ogden. After boring six days, and attaining a depth of 200 feet, a six-foot flow of perfectly odorless gas was struck. In boring, the drill passed through a shale, which is impregnated with oil. Flows have since been struck in two other wells. The region of country east of the Great Salt Lake shore and the Utah Lake shore has been for many years regarded as rich in oil and gas. At Brigham City, natural gas has been used for three or four years in burning brick and lime. The same thing has been done at Lehi, 22 miles south of Salt Lake City.

In the long fought and important mining litigation, the Old Jordan Mining Company vs. the Niagara Mining Company, Utah, involving the question of which had the apex of rich ore to the ledges, Judge Anderson has found for the defendant and dissolved all injunctions. The interests involved are very heavy, being probably over \$1,000,000. The Niagara will now push work on its claims in Bingham mining district.

AFTER twelve years' litigation, from the Circuit Court in Montana to the Supreme Court of the United States, whose decisions have been made favorable first to one side and then to the other, C. S. Warren, owner of the Butte *Inter-Mountain*, has been accorded the ownership of the Comanche copper mine, in Anaconda, through the decision of the highest court.

NATURAL GAS has been struck near Los Angeles. It is pouring out in large quantities under a high pressure, and appears to possess all the qualities necessary for heat and power purposes. The well has been bored by L. W. Hellman on his ranch a mile or so east of Boyle Heights, formerly known as the Repette place.

THE Virginia *Chronicle* of the 4th says the heaviest bar of bullion ever shipped from the Comstock arrived at the Carson Miot last night. It was from the Con. Virginia and weighed 153 pounds. It was valued at \$3600.

THE Mono County Miners' Association was organized March 1st with 36 members, and officered as follows: President, C. L. Hays; Vice-President, A. J. Severe; Secretary, Clay Hampton; Treasurer, J. A. Brown.

THE San Francisco stockbrokers who are drawing salaries as mining officials may have, many of them, to get back to the commission business again.

ANOTHER Colorado mining boom is in Bonanza, a camp 200 miles south of Denver. Numbers of men are going to the new camp.

ROSS E. BROWNE, the well-known mining engineer, has gone with Felix Chappet to Mexico to examine and report on a mine.

ON account of overstock and scant orders, the puddling crews of many of the Pittsburgh iron works have been suspended.

THERE were 215 lives lost by the explosion and fire in the Charlevoix coal mines, France. The mine has been flooded.

ANOTHER strike of natural gas has been made on the shore of Salt Lake, Utah. A heavy flow of gas has been found.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

THE MOTHER LONE.—Amador Record, March 17: Amador county continues to hold its own so far as its mines are concerned, and the indications are that it will enjoy increased prosperity in that direction. We feel confident that there is to be a general renewal of interest in the mining industry all along the line, and certainly if such should be the case, old Amador is likely to come in for a goodly share of attention. It is quite reasonable to suppose that the past history and the present status of our mines will continue to attract the investment of capital.

THE KENNEDY MINE, situated about three miles south of Sutter Creek on the mother lode, is said to be the best paying gold mine in the State. Last year, it paid the shareholders \$310,000 in dividends. A mine that has made as good a showing as this, is surely worthy of notice, and at some future time we hope to be able to give our readers a full description of the great dividend producer. We are led to believe that a good deal of the success the mine is now enjoying is due to the skillful management of the superintendent, J. F. Parks.

THE SOUTH SPRING HILL MINE, near Amador City, is owned by a Boston company with J. R. Tregloan, an experienced mining man, as superintendent. The mine has been operated for some 12 years past, and has paid handsome dividends. There is a 40-stamp mill, and recently arrangements have been effected for running both the mill and hoisting works by water power. This change will reduce the working expenses considerably. The shaft is down 900 feet.

THE KEYSTONE MINE is located in the same district as the above, and has been a dividend payer since the early fifties, some four or five millions having been disbursed among the owners. The mill has 40 stamps, but at present only 25 are being run. E. T. Hale is the superintendent, and the working force consists of about 70 men. The shaft is down 1400 feet.

THE SOUTH EUREKA MINE is, strictly speaking, a home enterprise, as it is under the control of parties here, although a portion of the stock will go to parties in San Francisco whenever certain conditions are fulfilled. The company was organized through the efforts of Jackson Dennis of Sutter Creek. The shaft has three compartments, and is down a depth of 465 feet. At present, the indications are considered very favorable for encountering the vein. It is in a direct line with the mother lode, and it adjoins the famous old Enreka mine, which was worked to a depth of 2200 feet and was yielding \$60,000 a month when the works were destroyed by fire. It is the universal opinion that the company is on the right track, and will ultimately develop a fine property. The mine is under the superintendency of J. F. Parks, while A. Reily is the foreman.

THE BELMONT MINE adjoins the Lincoln and Hector mines and is but a stone's throw from town. At present, the ten-stamp mill is running on surface ore. The vein is worked 10 to 20 feet in width, and is worked through a tunnel five by eight feet in the clear and 600 feet in length. On the northern portion of the claim a shaft has been sunk 75 feet. The water being too strong for their present power, operations in that quarter have ceased temporarily. The company proposes substituting steam, which will enable them to explore on deeper levels. The future for the mine is very encouraging, as the vein has been exposed several hundred feet in length, and as depth is attained, and the vein concentrated between well-defined walls, wonderful results may be looked for from deeper levels. James Tibbets, the company's superintendent, manages its affairs in a capable and practical manner.

THE WILMAN MINE, which is located at Sutter Creek, is rapidly coming into prominence as a bullion producer. The mine is fully equipped with all the modern improvements, consisting of a complete water hoist, one of Knight & Co.'s hydraulic pumping engines, air compressor and a complete set of circular and upright saws for framing timbers. Thirty stamps constitute their milling plant, and it is supplied with improved rock breakers and Frue and Triumph concentrators. A shaft has been driven down 900 feet. The milling ore comes principally from the 800 foot level from a vein 40 feet in width in a granite formation. Occasionally, large layers of the latter material are encountered in the vein, thereby reducing the value of the ore. The company now sorts the ore, and as a consequence only ten stamps are kept running at present. On the 900 foot level, stations have been cut and drifts run into the ore chute where the vein is free from granite, which is so frequently encountered on the 800 level. Supt. John Tregloan informs us that it will not be long before stopping will be in order on the lower level and the mill running to its full capacity.

Calaveras.

ANGELS.—Calaveras Chronicle, March 19: The Utica Company are preparing to erect an additional 40-stamp mill on the Stickles mine.

PUTTING UP MILL.—Messrs. Pellaton, Pfeiffer, Fisher and Wait, owners of the Democrat gravel mine, in Tunnel Ridge, are erecting a three-stamp mill and have it nearly completed. The mill purchased is the one formerly used on the Tuttle mine, in Chili gulch. It will be but a few days before the mill will be in operation.

QUAKER MINE.—The work of sinking the vertical shaft in the Quaker quartz mine is progressing favorably under the careful attention and intelligent management of our friend Hugh McSorley, who has been installed as the

superintendent. The shaft will be sunk 200 feet, when it will then have attained a depth of 600 feet.

MILL MOVED.—The 40-stamp mill on the Ilex mine, near Rich gulch, has been taken down and is now being moved to Angels. A number of large teams are engaged in the transportation.

LUCKY.—Mrs. Fred Mayer, of the Monitor House on Center street, was the lucky finder of a nugget of gold, valued at \$5, while working in her flower garden adjoining the Monitor House.

Nevada.

GOLD BEARING QUARTZ NEAR TRUCKEE.—Grass Valley Union, March 18: J. E. Gudden was fishing up the Truckee river Wednesday morning and discovered gold-bearing quartz. He was searching for willow worms for bait in a stream that flows down across the stage road, when he discovered the rock. There are several pieces showing free gold. There is much excitement over the matter, not only because of the specimens discovered, but because there is known to be a rich ledge in that vicinity. The ruins of Knoxville and Elizabethtown are silent witnesses of the fact that there was once a tremendous mining excitement not far from that region. Hundreds of people flocked to this country and started full-fledged mining towns. There were fair prospects to be obtained in many places, but the main ledge could not be found and the excitement subsided. Gudden's discovery is three or four miles nearer Truckee than Knoxville, and it may be he has found the croppings of the long-sought gold mine. Years ago a landslide occurred on the west bank of the Truckee river, opposite the old Fish ranch. Many particles of free gold were panned out of the earth that was uncovered. There is a rich ledge somewhere close to the river, and we hope Gudden has found it. Immediate steps will be taken to thoroughly prospect the region.

HUNSON BAY MINE.—Grass Valley Telegraph, March 16: For some time past Mr. Alf. Tregidgo has been working the Hudson Bay mine, situated a few hundred yards north of the North Star mine. The ground is owned by Martin Ford and others, and a long time ago some very rich ore was taken from a prospect hole on the property. A new shaft has just been sunk by Mr. Tregidgo and is now down about 80 feet. Water has been reached and machinery will be immediately placed on the ground.

W. Y. O. D. DIVIDEND.—Grass Valley Tidings, March 18: The directors of the W. Y. O. D. mining company, of Grass Valley, have declared dividend No. 7, of ten cents per share, aggregating \$3,000. To date, the mine has paid for a splendid hoisting, pumping and milling plant and \$15,000 in dividends, and there are many more dividends in sight.

THE W. Y. O. D. MINING SUIT.—Grass Valley Union, March 16: Frank Richards, on behalf of himself and others, has brought suit against the W. Y. O. D. Mining Co. for the value of certain shares of the company, estimated at \$30,540. This suit is based on what is claimed to have been an agreement on the part of the company to pay certain miners for labor in part cash and part shares of the company, upon condition that the stock should be unassessable. The complaint says the company did not keep this agreement, but subsequently assessed the stock and sold it out for non-payment of the same, and that the stock so sold is now of the value as sued for. The W. Y. O. D. officers say they do not attach much importance to the suit; that the plaintiffs have no valid claim, and that the suit would never have been thought of had it not been that the mine is now proving valuable. Some of the parties named never complied with an agreement to work, and none claimed or demanded stock, and, besides, the company never agreed to issue unassessable stock.

Placer.

TWO GRAVEL CHANNELS AND ONE CLAIM.—Grass Valley Tidings, March 18: The great Mayflower drift mine near Forest Hill, in Placer county, continues to send out good reports. Some two years ago, in working up the channel in this mine, they cut through another gravel channel at right angles, which was lighter in color, softer and more easily worked than the Mayflower, and which they named the Oreno. The Mayflower had apparently been cut in two by the Oreno, and, after crossing the latter a distance of nearly 200 feet, they came into the Mayflower again, and have continued up that channel, and have worked it, to date, for a distance of about 8000 feet. The company own the Oreno some 7000 feet, and recently they have commenced operations on this channel. The returns from it are very encouraging. One run of 29 tons recently yielded \$6 per ton, and a still later run of 94 tons yielded \$7.75 per ton. The channel will average over 100 feet in width, and when one estimates the amount of gravel that lies in a channel averaging 100 feet in width and 7000 feet long, and figures it at say \$7 a ton, he can form some idea as to the amount of wealth insured to the Mayflower Company by the apparently accidental but fortunate discovery of the Oreno channel.

DRIFT MINE.—Placer Herald, March 12: The Harmon drift mine, a few miles east of Rocklin, is working about 20 men and report says it is paying big. Some of the gravel is said to go almost an ounce of gold to the pound.

Shasta.

BIG MINING EXCITEMENT.—Redding Free Press, March 19: The recent rich discoveries of silver ore in the Igo district are creating much excitement and bringing into the districts many locators. The rich mineral belt is about four miles long and a little over a mile wide. Fully 50 persons have located. One man, to be sure of getting enough of a good thing, has located 25 claims. All along the belt can be found location notices, and the excitement runs high.

Several have gone over from Redding and secured claims. The ore contains both gold and silver, and until water is reached the pure stuff can be scraped off the rock. When the water is reached, the ore becomes base. Tisher & Zoellin have taken out four tons of rock in going 15 feet, which will go \$200 to the ton. Groener & Richter have sunk on a ledge, and it is said that wire silver can be seen in the quartz. O. Engle of Igo was over Wednesday, and he gave us the following reliable information: Enbanks, who is now running a tunnel to tap his ledge 60 feet deep, recently shipped 17 sacks of ore, getting a return of \$112.80. John Wright shipped 14 sacks and received therefrom \$160. Mr. Budd, with 44 sacks, netted \$500. This is a pretty good showing and shows rich rock. Mr. Rothwell, the pioneer miner of this section, bonded his mine some time ago to San Francisco parties, who have run tunnels and sunk shafts, taking out more than enough money to pay expenses. They have until May 1st to buy the mine for \$25,000, and there is scarcely a doubt but that they will secure it. It is expected that in a few months there will be erected a plant near by, thus obviating the necessity of shipping the ore. A man named Patrick Marley has some 20 men employed in clearing away for a mill site and furnace.

MINING ITEMS.—John White, the carpenter, has a splendid mining prospect on Clear Creek, near Shasta, and thinks that he will in future devote the most of his attention to mining. He is preparing to ship some of his rich ore. News comes from all over the county indicating that our mining interests will boom during the coming spring and summer. In Whiskeytown, Col. Moore and J. S. Strode are preparing for extensive mining operations. Another year, and the mines of Shasta county will have made great advances. O. Engle has sold a half interest in the Flicker mine on Kanaka gulch, opposite Mule Mountain, to the Hoskin Bros., Cornish miners. The price received was \$1000. This mine contains rich gold quartz. As high as \$2 has been panned out of a pound of the ore, and some of it goes as high as \$4000 to the ton. Mr. Engle, being a poor man, was unable to operate the mine alone. J. H. Morton has bonded the Yankee Blade and contiguous mines, located on the road to Iron Mountain, between Shasta and Spring Creek, near the Mike Wels place. A working fund has been deposited in the bank and a force of men will be employed in running tunnels and sinking shafts. If, after proper investigation, there appears to be a mine there, machinery will be put up. The property has been bonded of Dick Moline, who purchased the Pehrson saloon. The ore assays well. Colonel Stevenson, a San Francisco mining man, representing English capital, has bonded the Ed Reid mine, adjoining the Mammoth and Central mines, in the Old Diggings district. Several tunnels have been run on the Reid mine, but no substantial development work has been made. There is, however, a good ledge three feet wide, with ore assaying as high as \$95 to the ton. Colonel Stevenson will run a new tunnel, and endeavor to open up the mine in good shape, and, if it turns out as he expects, machinery will be put up and the property worked for all there is in it.

MINING SALES.—Shasta Democrat, March 16: The group of mines in Old Diggings district known as the Reid mine, and owned by E. A. Reid, John Salvave, W. H. Clendennen, and T. E. Dix, has been sold under a stipulated agreement to Robert Stevenson of San Francisco. The agreement runs for two years, and under it Stevenson agrees to give them \$5000 on the first day of April, 1893, and \$20,000 on the first day of April, 1894. Stevenson takes possession the first of next month, and will proceed to thoroughly develop the property. A. T. Molin, V. A. Molin, and John Wright have sold their claims situated on Spring creek, near the old Stump ranch, to Robert Stevenson and J. H. Morton for \$3000, the sale to be consummated in accordance with a stipulated agreement, on or before the 27th day of next November. We understand that the purchasers of this property intend to soon put up a milling plant on the same.

Sierra.

KEYSTONE.—Mountain Messenger, March 19: Six men are working at the Keystone quartz mine, owned by Senator M. H. Mead. Good paying ore, of which there is a large amount on hand, is being crushed at the mill.

Siskiyou.

QUARTZ AND PLACER.—Yreka Journal, March 16: J. H. Van Nader discovered a fine five-foot ledge of quartz on Humbug last week, which prospects from \$15 to \$20 per ton, creating much excitement on the creek, as it is the largest lode yet discovered in that district. It is in the neighborhood of the Hegler & Aldrich quartz mine, and gives promise of being a permanent lode of great value. Jos. Travelli and Tom Baxter have also located an extension on the ledge discovered by Van Nader, which is believed to be quite as extensive. Work will be commenced in sinking shafts and opening the ledge to fully determine its permanency. Ed. Sheffield finds good prospects and is taking out good pay from the Uncle Sam quartz mine at Salmon river, which is 12 feet thick at surface and also in the tunnel at 500 feet below the surface. The Gold Ball Mining Co. is taking out exceedingly rich quartz, and rumor says the owners of the mine are considering a proposition to sell for half a million dollars. The Ballarat Mining Co., at work in the old Chinese hydraulic claim on Spring gulch, at northern boundary of Yreka, finds considerable water to contend with, and may be obliged to put up more powerful pumping machinery to reach bedrock under the cement bottom washed by the Chinese. There is no doubt that rich pay will be realized on reaching the bedrock, and cause a general working of Yreka Flats, where many suppose the shallow diggings of

early days have a deeper strata of rich gravel under later bedrock and cement.

THE HYDRAULIC MINES at Quartz Valley, Oro Fino, Pinery and other sections on west side of Scott Valley, have commenced piping, since the late warm weather fills the ditches with water, by melting the great snowbanks on the Salmon range of mountains. The miners in these localities expect to take out more dust this season than ever before, as there will be a good supply of water until later in the season than usual. The Scheld Brothers are now busy at work in their claim in Greenhorn gulch, where the pay gravel is improving in richness. Owing to spigate water from above, they have considerable trouble in working, especially since the rain storm and filling up of the big ditch some distance above the claim.

PORTUGUESE COMPANIES at Hawkinsville have fixed up the big ditch to some extent, so as to get a supply of water from Forest House creek to their claims at Hawkinsville. They have an abundance of water, but the flumes at Greenhorn creek, Greenhorn gulch, Long gulch and Humbug gulch leak so badly that only a limited amount can be secured at Hawkinsville. They will be able, however, to take out considerable gold dust before the water supply slacks up, and if new flumes were built, could mine all summer. Lee, Lash & Co. have suspended work in their blue gravel claim at Greenhorn, in consequence of the great amount of water to handle, resulting mainly from so much leakage of the dilapidated flumes of big ditch. As soon as the water slacks up when hot weather comes, they will start their steam pump again, to reach bedrock in their new shaft near the Yreka and Scott Valley stage road.

HUMBUG CITY, at Forks of Humbug, which was quite a place during the '50 period when placer mining was carried on with great success, is coming to the front again as an important business center, by reason of the quartz mines turning out well in the yield of gold. New buildings are being erected for store, hotel and postoffice applied for, which, with the quartz mills near by and other houses, will make that place resume its prosperity and appearance of pioneer days. In addition to being a central trading point for the quartz and placer mines along the creek and all its tributaries, Humbug City will also be a station for change of horses on the Yreka and Oak Bar stage line, running from Yreka to the Klamath river mining sections, and is only about a quarter of a mile above the crossing where the stage to Honolulu crosses the creek from Yreka, so that parties can reach Humbug creek by either the Oak Bar or Honolulu stages, the former going up the creek to Little Humbug in reaching the Klamath, while the latter passes down the main creek to Lower Humbug and the Klamath.

THE BELLERET MINE.—Telegram, March 18: Work on the shaft of the Belleret Co. mine, on the flats north of town, is being carried on with all the speed possible, as they have a vast amount of water to handle which necessarily makes it very slow work; but with all this, they are down somewhere in the neighborhood of 30 feet. The Telegram called on them the forepart of the week, and was delighted to see the gravel they were getting from the bottom of the shaft, which by the way carries some gold, small iron cubes and a vast amount of black sand. They expect to strike bedrock in five or six days. Should it pay wages, the work will be prosecuted to its fullest extent, and should they strike rich, there will be in the neighborhood of a thousand men at work on the flats inside of two months, making the old town of Yreka appear as she did in the early fifties.

Tuolumne.

POCKETS.—Tuolumne Independent March 16: It was rumored nearly two months ago that A. W. Stinchfield had struck a pocket in his mine at Jackass Hill. We were unable at the time to verify the report, and have refrained from making a statement concerning the matter until we could be satisfied that it was correct. A number of well-known residents of the Hill have since told us that Mr. Stinchfield's pocket was a little over \$6000. It was reported at the time that he had taken out \$10,000. Isaac Copeland of Vallecito was in town Saturday. He is foreman for the Vallecito Mine Company, which is making arrangements for hydraulicking a gravel claim. Hank Gale has purchased Urban Conklin's interest in the pocket mine on Thompson's Hill, known as the Conklin & Lawson mine. The prospect is very fine, and Gale & Lawson will push the work of development. The mine has already furnished several handsome pockets. A. W. Stinchfield of Tuttle town has been drifting under Table Mountain and has found the pay gravel of the ancient river bed. It is said that he is getting some of the largest nuggets that have been found for years. The Last Chance, or Colby claim, owned by Conrad & Colby, situated in Sonora, was leased last May by Oliver, Johnson, Kelly and Dart. Colby, it is understood, took out \$42,000 while he was working the claim. Since the present lessees have worked the mine, they have taken out \$13,000 from one pocket, \$4000 from another, and smaller lumps aggregating \$200 more. They are now working on the English reef of slate. Lee McPherson, who is supposed to have found the old, lost Nigger Gulch lead, on the Jarvis ranch, north of Columbia, now has men working night and day. Work has been stopped at the Platt & Gilson mine at Soulsbyville, the vein having pinched out. The parties who were working it have purchased the Gerry-mander mine, near the Golden Gate, and will prospect it thoroughly. Uncle George Norton is still working his claim in the northern part of town, hoping to find a hunch such as rewarded his labor in the same vicinity in early days. He has a very fine body of quartz and a large vein of the very finest kind of slate, which, when he reaches the crossing, may

show a handsome hunch of gold. He finds some very pretty pieces of gold occasionally.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Enterprise, March 19: There has been extracted from all parts of the mine during the week 1020, 1790, 2000 tons of ore, which was shipped to the Morgan mill. The average value of all of the ore worked at that mill during the week, 980 tons, was \$20.75 per ton. Bullion shipped to the Carson Mint, assay value about \$15,184.30.

OPHIR.—1465 level.—The crosscut running east from the drift run north from the drift run west from the winze 122 feet below the sill floor of the 1300 level, has been advanced 21 feet; total length, 32 feet; in porphyry and quartz of low assay value. Have continued the work of repairing and retimbering the main south drift on this level. Shipped to Eureka mill 200, 380, 2000 tons of ore. The average assay value of all the ore worked at that mill during the week, 53, 1350, 2000 tons, was \$18.08 per ton.

MEXICAN.—On the 1465 level, the crosscut running east from the bottom of the winze sunk 101 feet down from the end of the crosscut run west 132 feet in from the main north lateral drift near the south boundary of the mine, has been advanced 20 feet; total length, 155 feet; the face is in soft porphyry.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. west drift from the shaft has been extended during the week 20 feet; total distance west from the shaft, 1760 feet; the face is in porphyry. From the Union Con. south lateral drift from the joint west drift, at a point 1570 feet west from the shaft, a west crosscut started near the south line of the mine has been extended during the week 22 feet; the face being in porphyry and clay.

SIERRA NEVADA.—The joint Sierra Nevada and Union west drift, 900 level, is out west of shaft 1750 feet; face in porphyry. The north drift from the Kenosha tunnel was advanced 40 feet; total distance, 751 feet; face in porphyry.

UTAH.—The west drift from the shaft station, 340 level, was extended 70 feet; total length of 280 feet, continuing in a porphyry formation showing some water.

ANDES.—On the 420 level, north drift from east crosscut No. 4 advanced 13 feet; formation porphyry. Suspended work in face of this drift for the present. To-day started a west crosscut from this drift, 99 feet south of the face. West crosscut No. 1 from north drift extended 5 feet and stopped for the present. Have been easing timbers in main north drift.

HALE AND NORCROSS.—On the 900 level, the north prospecting drift started from the top of the north upraise was advanced 10 feet; total length, 45 feet; face in quartz. On the 1500 level we have resumed work in No. 1 winze, started 75 feet north of the incline, and sunk same 5 feet; total depth, 15 feet. Bottom is in quartz showing some pay ore. We resumed work in No. 2 east crosscut and advanced same 10 feet; total length, 35 feet; face in porphyry. This crosscut will connect with No. 2 winze from 1500 level and give us ventilation on both of these levels, and enable us to open an intermediate level between the 1500 and 1630 levels.

BEST AND BELCHER.—900 level, east crosscut No. 1 has been advanced 20 feet through porphyry and seams of quartz; total length, 35 feet. All work in west crosscut during the week has been on repairs.

GODD AND CURRY.—200 level: Northwest drift, 435 feet west of shaft, has been extended 20 feet through soft porphyry; total, 112 feet. South drift from upraise No. 2, 65 feet above this level, has been extended 12 feet through quartz giving low assays; total length, 64 feet.

CHOLLAR.—Are making repairs on 400, 550 and 650 levels. The south drift from joint west crosscut, 1640 level, is out 144 feet; face in porphyry.

BILLION.—Are resiping south drift, 1300 level. The joint west crosscut, on north line, 1300 level, is out 42 feet; face in porphyry. The east crosscut, 120 feet south of north line, 1500 level, is out 191 feet; face in porphyry. The southwest drift from Ward shaft, 1800 level, is out 1235 feet; face in a mixture of porphyry, clay and low-grade quartz.

WARD COMBINATION SHAFT.—The southwest drift from the shaft, 1800 level, is out 1235 feet, face in a mixture of porphyry, clay and low-grade quartz.

ALPHA.—The west crosscut from north drift, 550 level, is out 8 feet; face in low-grade quartz. The southwest drift from the Ward shaft, 1800 level, is out 1235 feet; face in a mixture of porphyry, clay and low-grade quartz.

EXCHEQUER.—The east crosscut, 150 feet south of north line, 600 level, is out 316 feet; face in porphyry.

CON. NEW YORK.—The raise from No. 4 west crosscut, 650 level, is up a distance of 53 feet; top in quartz showing hunches of fair ore.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 590 feet; face in gypsum and porphyry.

ARIZONA.

PROSPECTING.—Prescott Journal-Miner, March 16: Since the strike by Butler & Wright on the Dividend, a mine that heretofore nothing was expected of, the country adjacent has been swarmed with miners eager to lease or in any way acquire properties. Prospectors are reported in large numbers, and a district which has been slumbering in inactivity is now reported prosperous and thrifty. The new strike of Messrs. Thompson, Gleason & Rowe continues to show up well in rich ore. These claims, as far as developed, show up richer than anything yet discovered in this section. The claims are located about nine miles south of Prescott, in the Hassayampa district. John S. Jones is ready to start his new mill on Big

Bug on ore from several of his claims. He has a complete and improved concern, and will do custom work shortly. He uses water as a power to run the mill, but will substitute steam later.

BRADSHAW BASIN.—Work on the Crowned King, at Bradshaw Basin, is to be resumed at once. A general supply of merchandise and other articles is being shipped from Prescott to last through summer. Water is in abundance in that country at present, but the transportation facilities as usual are bad.

THE BOYCUS SYSTEM of placer mining will be introduced in the Stanton gold fields. S. E. Fuller, to whom can be given the credit of inducing the capitalists to take hold of the proposition, is at present on the ground, and, as stated before leaving Prescott, that though the system is comparatively an old one, it has been in successful operation recently in many localities of the West under the improvements which have been made to it of late. The amalgamation process was used, so there is no possibility of the loss of gold, no matter how fine the metal may be, or whether the ground be wet or dry. This system, under its improved order, is receiving considerable attention from the press and public, and promises to be a boom to the placer mining element.

AT WORK.—Since the Supreme Court has handed down its decision in the celebrated case of Clay vs. the Silver King Mining Company, on Groom Creek, which was in favor of the company, a force of 20 men has been put to work on the mine, under the superintendency of Mr. Barstow. Two shifts are at work sinking, drifting and stopping. The mine looks better after every shot, and gives every indication of developing into a bonanza. The first-class ore is sacked and shipped to Prescott, while the Greenwood mill, near by, reduces the second grade. Returns from a recent shipment gave a 400-ounce return in silver per ton.

HYDRAULICS.—The recent cleanup at the Lynx Creek hydraulics, on an 18 days' run, gave as result several thousand dollars of the yellow metal. The run was very satisfactory and was made for the benefit of Mr. McIlraith, the Secretary of the company, who is on a visit to the works at present from England. The success attending this enterprise in past runs has stimulated the company to such an extent that the rebuilding of the dam will be commenced at once, while other propositions calling for the expenditure of many thousands of dollars show a faith in our various interests commendable of this company's liberality and push, which we are glad to chronicle.

DIVIDEND.—Butler & Wright, who arrived in this section recently from Colorado, and secured a lease on the Dividend mine in Big Bug from Judge John A. Rush, are meeting with deserved success, and at the same time demonstrating that before you can lay claim to a mine you first have to go down on it. The Dividend is one of the first mines patented in Northern Arizona, and has a history in its early life filled with extreme interest, being the scene, in the '60's, where many miners fell by Apache warfare, making the district thereby one of insecurity to life and an impossibility to prospect in. The original workings on this mine were cleared of the debris, and the indications being such in the eyes of the present lessees as to warrant sinking, they undertook the work, and have been handsomely rewarded. The same gentlemen have also secured a lease on the Little Jesse, an extension of the Dividend, with likewise good results. It is stated that during the last three months \$15,000 has been taken out by this firm, and that, too, from claims which have been passed over by the prospector for years as not even worthy of the experiment a stick of giant powder might reveal if exploded in the right place.

NEVADA.

Tuscarora District.

NAVAJO.—Tuscarora Times-Review, March 18: South drift, 350-foot level, extended two feet. Have started a winze below the 350-foot level, on a small stringer of rich ore.

BELLE ISLE.—East crosscut No. 1, 350-foot level, extended eight feet. West crosscut, same level, extended 19 feet.

NORTH BELLE ISLE.—West crosscut south, 400-foot level, extended 12 feet. North intermediate, above the south 500-foot level, extended 11 feet; vein not looking as well. No. 4 north drift, south 500-foot level, extended 24 feet, showing some low-grade ore.

NEVADA QUEEN.—Eighty eight cars of second-class ore, average assay \$49 per ton, and three tons first class, average \$336 per ton.

DEL NORTE.—Second level: Stopes produced 18 cars of ore. Have started raise east from the No. 1 raise. Third level: No. 1 raise has been put up 22 feet; will cut the vein this week. Shipped 25 tons of ore to sampling works; average assay \$275 per ton.

NORTH COMMONWEALTH.—Second level: Stopes have produced 23 cars of ore, assay value \$50 per ton, and two tons assay value \$300 per ton.

OREGON.

MACHINERY ARRIVAL.—The arrival of large shipments of mill machinery for the mines adjacent to Baker City gives assurance of more extensive mining operations than ever before known in the history of the county. The machinery for the Bailey-Elkhorn mine purchased by Mr. L. W. Nelson on his recent visit to San Francisco is beginning to arrive, and as fast as unloaded from the cars, will be taken to the mine. Yesterday one of the Bryan mills was received, together with other machinery. There is a delay in the shipment of the other Bryan mill on account of its construction not being completed. It will arrive, however, in a few days. The machinery for the ten-stamp mill for the Virtue M., M. & D. Company is, also, arriving and being forwarded to the Virtue mine by wagon.

The California Miners' Association.

Officers, Committees and Constitution and By-Laws of the State Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized.

The officers of the Association are as follows:

HON. J. H. NEFF.....President.
W. C. RALSTON.....Secretary.
THOS. B. EVERETT.....Ass't Secretary.
H. PICHOR.....Treasurer.

VICE-PRESIDENTS.

NAME.	COUNTY.
R. F. Grigsby.....	Napa
Henry Martu.....	Trinity
Geo. W. Thomas.....	Marin
Frank R. Webe.....	Sierra
Woolston Banghart.....	San Mateo
R. H. Campbell.....	Siskiyou
Jas. O'Brien.....	Yuba
Frank Fitzgerald.....	Inyo
A. B. Call.....	Amador
Dixon Brabban.....	Plumas
J. F. Ryan.....	Humboldt
Aaron Bell.....	Shasta
H. O. Harvey.....	Sacramento
D. K. Perkins.....	Butte
A. M. Hardie.....	San Luis Obispo
A. Tregidgo.....	Nevada
Ex-Gov. H. G. Blaisdell.....	Alameda
T. B. Morse.....	Calaveras
Hon. A. M. Clark.....	Fresno
Hon. J. K. Luttrell.....	Sonoma
J. J. Crawford.....	El Dorado
R. M. Folger.....	Mono
Geo. F. Hoyle.....	Orange
R. McMurray.....	San Francisco
W. S. Chapman.....	San Francisco
I. C. Stump.....	San Francisco
C. T. Lacy.....	San Francisco
A. J. Ralston.....	San Francisco
John W. Maxwell.....	Tuolumne
Hon. R. Clark.....	Colusa
C. F. Reed.....	Placer
Chas. Bogan.....	Mariposa
James H. Lawrence.....	Merced

EXECUTIVE COMMITTEE.

Hon. J. H. Neff, Placer.	H. A. McCraney, Lake.
Louis Glass, San Francisco.	Jas. Tunstead, Marin.
Col. Dan M. Burne, S. F.	A. M. Bryant, Mono.
Col. F. McLaughlin, Butte.	W. K. Alderley, Napa.
S. K. Thornton, S. F.	Chas. Bogan, Mariposa.
Wm. Ireland Jr., S. F.	Jas. H. Lawrence, Merced.
Hon. C. W. Cross, Nevada.	Hon. J. M. Walling, Nevada.
Chas. G. Yale, San Francisco.	D. C. Pilex, Orange.
J. B. Hobson, Placer.	John Spaulding, Placer.
Hon. Edw. Coleman, Nevada.	W. W. Kellogg, Plumas.
Hon. A. Walath, S. F.	M. M. Drew, Sacramento.
Hon. J. K. Luttrell, Sonoma.	Thos. R. Church, S. F.
Ex-Gov. H. G. Blaisdell, Alameda.	John Hays Hammond, S. F.
Hon. Joo. Daggett, Siskiyou.	Myron Angel, S. L. Obispo.
Hon. E. O. Voorheis, Amador.	N. J. Brittan, San Mateo.
E. W. Fogg, Butte.	George M. Pinney, Sierra.
John F. Davis, Calaveras.	R. G. Hart, Shasta.
John Boggs, Colusa.	A. W. Dana, Sonoma.
Hon. Thos. Fraser, El Dorado.	A. Hewell, Stanislaus.
Mr. McDonald, Fresno.	O. P. Berry, Sutter.
W. H. Pratt, Humboldt.	O. McMunnahao, Tuolumne.
Hon. Patrick Reddy, Inyo.	G. O. Kimball, Tehama.
J. O. Miller, Kern.	John McMurray, Trinity.
	O. G. Mayo, Yuba.

FINANCE COMMITTEE.

Louis Glass, San Francisco	Edward Coleman, Grass Valley.
Wm. Ireland Jr., S. F.	S. K. Thornton, S. F.
N. J. Brittan, San Mateo.	John Hays Hammond, S. F.

COMMITTEE TO FORMULATE AND PROMOTE THE ADOPTION OF AMENDMENTS TO MINING STATUTES.

Hon. Niles Scaries, of Nevada	J. M. Fulweller, Placer.
Hon. O. W. Cross, S. F.	H. I. Thornton, S. F.
	Hon. J. K. Luttrell, Sonoma.

COMMITTEE OF CONFERENCE WITH RIVER AND HARBOR CONVENTION COMMITTEE.

R. G. Hart, Shasta.	Wm. Ireland Jr., S. F.
Frank McLaughlin, Butte.	J. B. Hobson, Placer.
Hon. J. K. Luttrell, Sonoma.	

DELEGATES TO WASHINGTON.

Hon. Niles Scaries, of Nevada County	
Hon. J. K. Luttrell, of Sonoma County.	
Robert McMurray, of Nevada County.	
J. B. Hobson, of Placer County.	

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

Sec. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of this organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of eleven members selected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

Sec. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

Sec. 3. The President and Secretary of the Association shall be ex officio President and Secretary of the Executive Committee.

tion shall be ex officio President and Secretary of the Executive Committee.

Sec. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of the Association.

Sec. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein prescribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

Sec. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall render annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in each sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

Sec. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by the President and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of the Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in each sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at the city and county of San Francisco.

Sec. 2. It shall be the duty of the Vice-Presidents of this Association to at once proceed to the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

Sec. 3. All persons friendly to the mining interests are eligible to become members of this Association. In the event that there is no County Organization, such person may unite with the State Association by forwarding his name to the Secretary thereof, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

Sec. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected as each County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by the Executive Committee, Jan. 22, 1892.

BY LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittee as they may determine. They shall fill all vacancies of the officers of the Association or members of any committee. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

Sec. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of an annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

Sec. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

Sec. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

Sec. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

Sec. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of each intended meeting.

Sec. VII.—The Secretary and Treasurer shall receive such compensation for their services as the Executive Committee may, from time to time, determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22d, 1892.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F., Stock Exchange Building.

MECHANICAL PROGRESS.

Plating Iron with Aluminum

The vast difference separating the electro-deposition of metal upon an article the size of a spoon, and doing the same work on the exterior surface of a building of massive proportions, can be readily appreciated. The difficulties encountered in electroplating pieces of large size are far greater in proportion when the work is applied to specimens of insignificant dimensions. Yet the Tacony Iron and Metal Co. at Tacony, Phila., has taken a contract to plate, electrically, a surface of material of nearly 100,000 square feet. The contract is for plating the upper part of the tower of the Philadelphia public buildings. The unusual part of the work is to be found not only in the great size of the separate pieces to be handled, but also in the material with which it is intended to cover the entire exterior. This is the first case of any magnitude whatever in which an attempt has been made to plate iron with aluminum. The tower is now finished for a distance of 335 feet from the ground, and from that point, the remainder to a height of 548 feet from the ground, or 213 feet additional, will consist of an exterior of cast iron, conforming in its architectural aspects with the lower stone portion, and supported by an interior framework of iron.

A recent visit of a representative of the *Iron Age* to the works of the Tacony Co. showed that extensive preparations had been made in order to successfully carry out this work. A large building has been erected, at the entrance of which one first sees six long tanks arranged in two rows of three each, and running down one side of the building. These tanks are made of yellow pine and measure 26 feet long by 8 feet deep and about 5 feet wide, and in them all the operations of preparing and plating the different members of the structure will be carried on. To illustrate the method pursued, we will suppose that a column of cast iron is to be plated with aluminum. At its entrance into the building, it is attached to an overhead trolley, running on a track extending parallel with the first row of tanks, or the one next the wall of the building. In these tanks it is cleansed and brought to the proper condition, and at the end is taken by a cross track where it enters the first tank of the second row. In this the final work of preparing the column is accomplished, and in the next tank, or the fifth from the start, the metal is electrically deposited. The final or sixth tank performs the washing operation, after which the column is taken from the building.

Each tank rests in a separate or independent cement pit, the top of which is on a level with the floor, which is also cemented and properly inclined so as to drain well, and in the cement pit so formed the wooden tank is placed. The pit is then filled with water, this construction being followed in order that the pressure of water upon the inside of the wooden tank may be counterbalanced by water pressure upon the exterior. Any shape can be handled, and any dimension that will go in the tank, or that is not over 26x5x8 feet, can be plated. The plating will consist of pure aluminum placed directly on the iron. An extended series of experiments which have been carried on at the works have shown that it is possible to plate economically with aluminum directly on the iron or to plate with the aluminum on a first deposit of copper.

Taking Slack of Towing Hawsers.

In these days when tow boats are so universally employed, even on ocean service, and especially on the Great Lakes, any improvement in methods or detail which will add to security or enlarge the sphere of activity is of great importance. Both on the Atlantic and on this coast, it is now becoming more customary to tow large rafts of logs for considerable distances at sea. In the case of loss of propeller or other accident, where it becomes necessary for one large steamer to tow another, the greatest trouble arises from liability to breakage of the tow rope, from sudden strains. An invention has lately been put into application which will doubtless be largely used in the future as it overcomes the greatest difficulty in towing. It is a steam engine device for taking up the slack in a towing hawser, and again paying it out as the irregularities of both tow boat and the boat towed, require, in irregular or rough seas.

This improvement has recently been tested under severe conditions, which put it in the shape of a complete success. The steamship *Saturn* of over 2200 tons, is fitted with this device, and on the Atlantic has

made two important and successful attempts to tow large ocean steamships in heavy weather, and to the astonishment of the officers of the ships towed, has proved beyond all reasonable question its capacity to do well and securely what is expected of it.

The invention as described by John M. Batchelor in the *American Contractor* consists of a drum on which the towing hawser winds, and connected to the drum are two small steam engines of sufficient power to offset the resistance of the vessel towed. When a rough sea puts a greater strain on the hawser—which in the present case is a steel cable—the engines permit its paying out until the resistance is again restored to an equilibrium, and when the motion of the sea slackens the cable, the engines wind up the slack, thus the cable is constantly kept taut, and prevents that breakage which is the result of too sudden strains.

Many tows have been lost through the parting of the hawsers at critical moments, and their abandonment was a necessity in consequence of the impossibility, in a rough sea, to connect another line.

The two successful trips of the *Saturn* were the towing of the steamship *Akaba* from Turks Island to New York, and the steamship *Federation* from the Bahamas to Philadelphia. The *Federation* is a 2472 ton steamship and the voyage of 1200 miles to Philadelphia was made through what the captain describes as cyclone seas. The *Akaba*, a British steamship of 3700 tons, made the trip in the teeth of the heaviest gale, the captain says, he ever experienced. During the severest weather the tow made five knots an hour, and the voyage was successfully completed the 28th of February last in six days.

Power for Subsidiary Operations

One of the striking features in recent rolling mill design is the growing use of electricity as a power for subsidiary operations. In a recent visit to the works of the Wellman Iron and Steel Company at Thurlow, Pa., says the *Iron Age*, we noticed that a billet-shipping apparatus was run by a motor, the billets being elevated and distributed automatically along the shipping platform. At the same works an electric crane for loading plates is soon to be built, an interesting feature of which will be that the plates will be picked up by a large electromagnet. The screw gear for the famous large Wellman three-high 34-inch plate mill is operated by a motor, and the ingots are taken out of the heating furnaces and transferred to the roll table by a car, all of whose movements are controlled by motors. We understand that Mr. Wellman is now designing a charging machine which will go even farther in this direction. The Pittsburgh Engineering Company is building for the Carbon Iron Company of Pittsburgh a large new plate mill, in which the latest features in the application of electricity for rolling mill work will be adopted by John F. Wilcox, who is making the designs. We understand that, among other things, the shear will be run by an electric motor. Electrical engineers are apt to misinterpret the requirements of rolling mill managers. Thus, accustomed to scan closely economy in line wires and insulation for light and traction installments, they fail to appreciate that a rolling mill manager is willing to pay for the very best for short distances, however extravagant it might be for town work. It is becoming quite evident that, besides the electric light plant, our modern rolling mills will have an electric power plant as a part of their equipment.

USES OF MANNESMANN TUBES.—A paper was recently read before the Polytechnic Society of Berlin on "Developments in the Manufacture of Mannesmann Tubes," by Herr Krause. In the paper the military applications of the tubes were described, such as steel projectiles, ordnance tubes, rifle-barrels, steel lances, etc. Reference was also made to the manufacture of carriage poles, telegraph poles and water conduits by this process, and specimens were exhibited showing the bending resistance of the tubes. The demand for tubes to be used in the manufacture of bicycles is already overtaxing the productive capacity of the Berlin branch of the works, says a correspondent of *Industries*. One of the most interesting departments of the Mannesmann establishment is that of the telegraph poles, which is at present very active. The Postal Government for East Africa has ordered large quantities of these poles. Orders for about 7000 telegraph poles have been recently received for use on the small Asiatic railways, while large supplies are now being sent to Holland. Messrs. Heckmann have introduced the Mannesmann process in connection with the manufacture of brass and copper tubes with good results.

SCIENTIFIC PROGRESS.

An Interesting Electrolytic Phenomenon.

In a communication recently made to the Académie Royale de Belgique, Prof. Lagrange and M. Paul Hoho describe some experiments made by them on a luminous and calorific phenomenon which takes place under certain conditions when a current is passed through an electrolyte. The phenomenon was first observed in 1844 by Foucault and Fizeau, and has subsequently also been investigated by Righi, Colley, Plante and others. Prof. Lagrange and M. Hoho employed in one experiment a 10 per cent solution of H_2SO_4 , the positive electrode being of copper with 180 square cms. in the liquid, the negative electrode being a copper wire $\frac{1}{4}$ mm. in diameter plunged in the electrolyte to a depth of $\frac{1}{2}$ mm. Current was obtained from a battery of accumulators. At first, only the ordinary phenomenon of electrolysis are observed; then, as the volts are increased, bubbling and boiling occur at the negative electrode; next, intermittent arcs take place between wire and liquid, finally a luminous cylinder is formed having the copper wire for axis, the current then becomes steady and the resistance very high. On plunging the wire farther into the liquid, this series of phenomena can be reproduced. Much the same effects were produced with platinum, zinc, tin, iron, steel and carbon electrodes of different diameters, with sulphuric acid solutions of different strengths, and with a chloride of sodium solution. The production of the luminosity is accompanied by an abnormal resistance which is localized round the negative electrode; with electrodes 29 cms. apart, practically all the fall of potential takes place within 5 mm. of the negative electrode. The shape of the negative electrodes appears to have but little influence. Luminous effects can be made to occur also at the positive, but with some difficulty. It is, however, impossible to produce luminosity at both poles at the same time.

FATIGUE OF METALS.—The question as to the fatigue of metals under long continued stress has been tested, and, it is believed, satisfactorily settled, in the treatment of two similar suspension bridge links and the results obtained. A square iron link 12 inches wide, 1 inch thick and about 12 feet long, was taken from a bridge at Kieff, Russia, then about 40 years old, and tested against a similar link which had lain unused in store ever since the building of the bridge. Under these circumstances, the means of comparison were considered in the highest degree favorable, and the result necessarily of a reliable character in determining whether or not iron actually loses, and to what extent, any of its strength in prolonged service. The effect of the test showed for the old used link an ultimate tensile strength of 21.8 tons per square inch, an elastic limit of 11.1 tons per square inch, an elongation of 14.5 per cent, and a contraction of 17.33 per cent at the point of fracture. In the case of unused link, the tensile strength was found to be 22.3 tons per square inch, with an elastic limit of 11.9 tons, and an elongation and contraction at fracture of 18.42 per cent, and 18.75 per cent, respectively. From this it appears, therefore, that the two pieces of iron were of practically identical strength, the small difference actually observed being well within the ordinary range of variability of similar pieces of such metal.—New York Sun.

THE MAGNETIC PROPERTIES OF OXYGEN.—Commenting on Prof. Dewar's recent experimental verification of the magnetic properties possessed by liquid oxygen, M. Guillaume points out in *L'Industrie Electrique* that if we accept the values found by Edmond Becquerel for the magnetic constant of oxygen, it ought, when in the liquid state, and in a field of medium strength, to possess a magnetic moment per cubic centimeter, one-third of that of iron, and a magnetic moment per gramme twice as great as that of iron; so that the strange conclusion is forced upon us that oxygen is the most magnetic of substances.

ANOTHER SUBSTITUTE FOR IVORY.—The unsuccessful attempts heretofore made to prepare an artificial ivory have more recently been followed by an effort to produce a substitute for the natural article, in which quicklime plays the most important part. In this process, says *World's Progress*, the quicklime is first treated with sufficient water to convert it into the hydrate, but previously to its becoming completely hydrated or slaked an aqueous solution of phosphoric acid is poured upon it, and, while stirring the mixture, calcium carbonate,

magnesia and alumina are incorporated in small quantities at a time, and, lastly, gelatine and albumen dissolved in water are added, the result aimed at being to obtain a composition sufficiently plastic and as intimately mixed as possible. It is then set aside to allow the phosphoric acid to complete its action upon the chalk, and the following day the mixture, while still plastic, is pressed into the desired form in molds, and dried in a current of air at a temperature of about 150° C. In three or four weeks the product becomes perfectly hard. The proportions for the mixture are 160 parts of quicklime, 300 parts of water, 75 parts phosphoric acid solution, 16 parts calcium carbonate, 1 to 2 parts magnesia, 5 parts alumina, precipitated, and 15 parts gelatine.

SPENT ACID FROM GALVANIZING WORKS. Messrs. Davies Bros. & Co., of Wolverhampton, England, the waste acid from whose works amounts to 10,000 gallons a day, have disposed of this all to a syndicate who will treat it by the Ramage process. This process, the invention of Mr. A. S. Ramage, a chemist of repute, is simple and comparatively inexpensive. The liquor or "pickle" is first run into precipitation tanks to allow of the deposit of all refuse; then it is passed into another tank where milk of lime, finely strained, is added in such proportions as to entirely neutralize all the acid and precipitate the iron in solution. During the process of precipitation, compressed air is blown through the hydrate of iron, by which process the oxygen is so far absorbed that the compound becomes ferrousferic hydrate. The subsequent processes include filtering through pressure-pumps, washing, drying and grinding to a fine powder, when the constituent becomes a marketable commodity as a coloring matter for paint, having a commercial value of £10 per ton. This, omitting some minor details, is the outline of a project for the solution of what has long been regarded as an insuperable difficulty, and it appears to us as having in it the elements of immediate success, if not of ultimate perfection. What its ultimate results to the whole district will be may be partially estimated from the fact that to the individual firm in question, the material hitherto regarded as "waste" will yield a gross revenue of something like £4000 a year, to say nothing of the saving in constant and costly litigation.

"THE WORLD IS STILL YOUNG AND SCIENCE IS NEVER OLD."—At the recent annual dinner of the Royal School of Mines in London, Sir Lyon Playfair, in his response to a toast, said: "We know by experience much more than we know by science in regard to the occurrence of metaliferous veins. To this day, unless my science has not kept pace with my age, we cannot satisfactorily explain the manner in which metals have been deposited in their lodes; how their ores were originally formed; why a lode is rich in some places and dead in others; why they exist in continuous veins or are scattered in separate pockets. If we understood the scientific causes of mining phenomena, their application to practical ends would soon become of importance and repay a hundredfold all costs of research. A single new scientific fact, in correlation with other known facts, often throws a flood of light upon our ignorance. I had the pleasure of seeing, a few months ago, in America, that remarkable meteoric mass of iron which had real diamonds interspersed with it. This gave support to the Glasgow experiments of producing diamonds in molten metal, and may ultimately lead the way to their artificial production. But whether it does or not, is of far less importance than the acquisition of knowledge as to the conditions under which bodies are produced in nature."

A NEW INSULATING MATERIAL.—A new material possessing improved insulating properties is composed of sulphur, 7 lbs.; pipe clay, $\frac{1}{2}$ lbs.; slate dust, $\frac{1}{2}$ lbs.; paraffin wax, 2 oz.; and a variable quantity of oxide. The quantity of oxide added depends chiefly upon the color which it is desired to give to the mixture. It may vary from one-half to one-fourth of the total weight of the other ingredients. In working up the mixture, the clay and slate dust are first thoroughly mixed together by grinding, the materials being heated. Paraffin wax is then added, and the mixture is incorporated into a paste. After exposure for a time, during which it becomes dry and hard, the compound is ground to a powder and then mixed with the proper quantities of sulphur and metallic oxide.—Iron.

CLOUDS continue to form around storms in a continuous sheet, thickest near the center of the storm, and thinnest and highest at the outer limits.

ELECTRICITY.

Transmission of Power.

One of the most profitable sessions of the National Electric Light Association was that devoted to the discussion of the electrical transmission of power. It was aptly initiated by Mr. Carl Hering's paper on the general problem as illustrated by the Lauffen-Frankfort plant, which has made such a sensation the past summer. There seems just now to be a wide diversity of opinion as to the methods that should be pursued in this long-distance work that is likely to become so prominent a factor of electrical engineering in the very near future. Continuous currents, the synchronous alternating system, the two and three-phase rotary field systems, all have enthusiastic advocates equipped with divers reasons for the superiority of their respective pet methods. The fine results obtained by the three-phase transmission from Lauffen to Frankfort have just at present raised that apparatus to the rank of a first-class electrical fad, and not without reason, for so excellent were the results obtained on the whole, as to lead to general confidence in the apparatus by which they were obtained. Nevertheless, in the transmission of power to long distances, we have very much to learn. The *Electrical World* has this to say in this connection:

High tension continuous current apparatus, several units running in series, has been tried only in a single isolated case, and with a moderate amount of success. The synchronous alternating method has been tried with excellent results in a single American plant, but over a short distance and under circumstances especially favorable to the case. The two-phase rotary field has not been tried upon a large scale at all, and the three-phase system only, as before mentioned, at Frankfort, and in connection with this, it may justly be remarked that the false currents due to static capacity of the line show in some of the Lauffen experiments to a rather discouraging amount. What we most need now in the way of practical information is a series of experiments on these various proposed methods, such as can be tried, however, in the shops of any large company. Concerning the direct current proposals, we wish to know the total efficiency, and the difficulties, perhaps serious, that may be met in the care of high-tension commutators carrying comparatively large currents. From all the alternating systems we desire to know the actual efficiency of transmission, and the nature and magnitude of the difficulties produced by static capacity of the line. In case, as Prof. Elhu Thomson very pertinently suggested, the conductors are put underground in iron pipes and insulated with oil, this capacity must be very considerable, and even with overhead lines the experience of Lauffen has shown this result. To be sure, the effect of capacity will be partly annulled by the self-induction of the apparatus, but to what extent is this practicable, and in any case is the capacity of the plant for useful output likely to be seriously cut down by the capacity of the line? Regarding the synchronous system, it is very desirable to know whether a convenient, cheap and simple starting apparatus is available, and whether, in addition, motors such as those devised by Mr. Stanley, and described in his paper at the convention, will meet the requirements for power distribution after the current has reached its destination. Regarding the two and three-phase rotary field methods, the working efficiency of the motors must be accurately determined, and the question of running many motors in parallel—concerning which some doubts have been expressed—must be definitely settled. The practicability of very high tension alternate current dynamos feeding the line directly, instead of by step-up transformers, must be thoroughly gone into. Meanwhile plants of more or less importance will have to be built with such apparatus as can now be commanded. The electrical transmission of energy is just now beginning to develop, and it will not do to be too hasty in deciding off-hand in favor of one method over another. We have for guidance only a few isolated and uncertain experiments, and while the success of long-distance transmission of power should never for a moment be doubted, the particular methods which will lead to it are as yet by no means definitely settled. Steady and persistent experimental work is necessary, and meantime the problems that actually present themselves must in most cases be solved by methods which have been thoroughly tried, for a single unsuccessful commercial experiment would do an untold amount of damage in the progress of the art.

COAL AND ELECTRICITY.—In his address at the Convention of the National Electric Light Association, President Chas. R. Huntley pointed out that, after all, the cost of coal to operate an electric plant is only one among many items, and frequently a small percentage of the total cost at that. For instance, in electric railway work, the cost of coal comes to about 10 per cent of the total operating expenses, while in electric lighting it does not probably exceed from 15 to 20 per cent. In these days when municipal plants are the subject of frequent discussion, these facts are generally lost sight of, and the cost of electric lights is calculated by reference to the amount of coal burned under the boiler; thus ignoring the fact that firemen, engineers, linemen, trimmers, etc., are required; that carbons require daily renewal, and globes break; that, like all other machinery, engines, boilers, dynamos and lamps are subject to depreciation, require repairs, that the building must be insured, and that a sinking fund must be established for renewals. Cheap power in itself would therefore influence the cost of electric lighting very little, even if the electric current is distributed in the immediate vicinity where it is generated; while its distribution to any considerable distance in large power units on a commercial basis seems to be awaiting its demonstration here rather than in Europe. Hence a study of the facts pointed out is recommended, which ought to make any community falter before investing in a municipal plant simply because it may happen to have what is supposed to be a cheap source of power around the corner.

FORGING BY ELECTRICITY.—The outer part of a piece of iron, when heated in a forge, is at a white heat, while the inner part is comparatively cool, and it cools so rapidly that several heatings may be necessary before it can be forged. In forging by electricity, the slow, alternating currents heat the inner part first, and the heating is so rapid that only the part that is in the path of the current is heated to any extent, the ends being hardly warm. A workman can handle a bar of iron a foot in length that has six inches red hot. The heating apparatus has bronze clamps, with electrodes, that hold the piece to be heated. A bar of iron can be heated to a white heat in a few seconds. A steel wire can be twisted in a spiral at one heat. A square bar of iron can be heated evenly throughout its length, worked into different shapes on an anvil and straightened again at one heat. In welding by electricity, the two pieces are brought end to end, and, the imperfect contact causing resistance, the ends become heated and are then pressed together.

THE DEVELOPMENT OF ELECTRIC TANNING.—According to *La Lumiere Electrique* several French tanners have adopted the electric tanning process, but have not made the fact public "for fear of displeasing a clientele always distrustful of new methods." The Societe Brion et Dupre is known to employ six drums, capable of an annual output of 600 tons of tanned hide. In Portugal there are two electric tanneries at work, at Porte and Braga, having an annual output of 700 tons of tanned hide; and in Madagascar an electric plant is being set up. In Brazil, at Boa Vista, some eight miles from Rio de Janeiro, there is an electric tannery covering about 13 acres, and possessing no less than 100 drums. The annual output of the Boa Vista plant will ultimately be about 70,000 tons.

ELECTRIC WELDING OF IRON WHEELS. Electric welding is now applied to the work of manufacturing iron wheels. The process of welding the nave, spokes and tire of a wheel is accomplished in 30 seconds. First, the tire is laid on the machine, then half of the nave which contains notches in which the spokes fit. The latter are laid in the nave, and inserted in the tire, and then the other half of the nave is laid on the top of the lower half. These are held together by hydraulic pressure. The electric current is turned on; the iron becomes heated to the proper degree and welds. The pressure is removed, and the now compact wheel is taken from its resting-place, rolled aside and allowed to cool. The work is done in very much less time than that taken by the old process.

NOT PROFITABLE TO THE COMPANIES.—Erasus Wiman, of New York, read a paper recently before the convention of the National Electrical Light Association at Buffalo, on "Electric Lighting from a financial standpoint." He stated that present prices for electric lighting were not profitable and urged the friends of the electrical industry to endeavor to impress that fact upon the public, declaring that if perfect service

is to be had better prices must be paid. Low prices have prevailed because the companies themselves have not heretofore appreciated and understood the cost of operation and the great loss due to accident and rapid depreciation.

GOOD HEALTH.

The Movement Cure.

Medical Inspector F. S. Clark, U. S. cruiser Baltimore, in a report to the Chief of the Bureau of Medicine and Surgery, U. S. Navy, speaks as follows of the Swedish gymnasiums: Sweden, where originated the "Movement Cure," has the most general and perfect system of gymnasiums. It is taught in the public and military schools. Officers of the army and navy are teachers. A captain in the navy has charge of the system in Stockholm. People continue to take exercise in these gymnastics until fifty or sixty years of age, for preservation of their health. Special gymnasiums are constructed for treatment of sick. In these, passive motion is first given by attendants with the use of the mechanical appliances. Later, patient begins to exercise himself with assistance. Dr. Zander's gymnastique is of special interest—the original and largest of its kind in the world. Its originality consists in applying passive motion by machinery run by steam. It occupies three large rooms, connecting, on the same floor. The ingenious machines are numerous and well calculated to bring into play almost every muscle and set of muscles. Students come to Stockholm from different countries to prepare themselves for teachers in their respective homes. Some of the diseases benefited are paralysis of all kinds, congestions of brain, kidney, liver, and pelvic viscera, dyspepsia, rheumatism, and those conditions due to sedentary habits. Even one case of phthisis pulmonalis claimed to be much better after six months' treatment by active and passive exercise of thoracic muscles.

FRUITS SHOULD BE WASHED.—The following curious instance is reported in a French journal by M. Schnirer of the ease with which tubercle bacilli may be disseminated. While at work one day in the laboratory of Weichselbaum, he sent for some grapes to refresh himself with. The fruit had been kept up for some time in a basket outside the laboratory, and was covered thickly with dust, so that the water in which it was washed was absolutely black. On examining the water, he reflected that, inasmuch as the neighboring street was traversed frequently by consumptive patients going to the clinic, the dust probably contained the desiccated sputa of these patients, charged with tubercle bacilli. To settle this point, M. Schnirer injected into three guinea pigs 10 cub. centim. of the water in which the grapes had been washed. One animal died in two days from peritonitis, the two others died on the 48th and 58th days, respectively, presenting marked tuberculous lesions, especially at the place of injection. The water in which the grapes had been washed was taken directly from the faucet, and the glass containing it had been sterilized. Neither the boy who had brought the grapes, nor the merchant who had sold them, was tuberculous. Hence the cause of infection was beyond doubt the dust on the grapes. This experiment illustrates the danger arising from the dissemination of desiccated tuberculous sputa in the air. The conclusion is obvious: Wash grapes before they are eaten.—*Jour. State Medical Society of Arkansas.*

CIGARETTE EYE.—Tobacco smoke has always been regarded by the faculty as more or less injurious to the eyes. Whether the belief is well founded or not, we are unable to say, says the *Ophthalmologist*, as symptoms attributed to one cause frequently owe their origin to an entirely different source. Ophthalmic pathology is not so far advanced, even now, that we can dogmatically assert that tobacco smoke is hurtful to the eye; the cornea we know has great power of resistance, and although the smoke may occasion catarritis, even this would not be permanent. However, in the case of cigarette smokers, there are other noxious factors at work than those contained in the tobacco. The paper must be taken into account. The chemicals employed in the manufacture may enter into the smoke and have a very deleterious effect. "Cigarette eye" is well known in New York. At the present time there is said to be quite an epidemic there. The symptoms are dimness and a film-like gathering over the eye, which appears and disappears at intervals. It is said to be very dangerous.

USEFUL INFORMATION.

SIGNALING BRAKES ON PIPE LINES.—Mr. W. H. Glore, superintendent of the Covington (Ky.) city water works, writes to the *Engineering News* concerning a novel signaling apparatus which is to be used there to give warning of leaks in the supply main or any accident along the line needing immediate attention. The water supply of Covington is pumped from the Ohio river to reservoirs from which it passes by gravity through some eight miles of pipe to the city. As there is but a single pipe line, it is especially necessary to keep close watch of and repair leaks as soon as possible. It is proposed to parallel the pipe line with a telegraph wire strung on poles. Connected with the wire will be signal boxes located in farm-houses and each having numbers. A card of instructions will be placed beside each box, with, for instance, the following code of signals: One ring, a landslide; two rings, a small leak; three rings, large leak; more than three rings, a serious break requiring immediate attention. The alarm will be sounded both in the city office of the works and at the pumping station, the number of the signal station being indicated as well as the character of the trouble. In case of a serious break, the men at the pumping station will at once proceed to the reservoir and shut off the supply from the main, after which, of course, men would proceed to the break to make repairs.

A METHOD OF NICKEL-PLATING.—The following process of nickel-plating trailing wheel parts and similar articles is said to have given excellent results, according to *Iron*. The bath is composed of 1000 g. of pure nickel sulphate, 750 g. of neutral tartaric acid ammonia, 5 g. of gallic acid (tannin) and 20 l. of water. The neutral tartaric acid ammonia is obtained by saturation of a solution of tartaric acid with ammonia. The nickel salt must be neutral. For this purpose the whole is dissolved in 3 to 4 l. of water, and allowed to boil for about a quarter of an hour. Then as much water is added as will produce altogether 20 l. of fluid, which is filtered. The precipitate obtained is very white, soft and uniform, and bears no traces of roughness on the surface. On crude or polished castings very heavy deposits can be obtained, and at a price which scarcely exceeds that of copper plating. Galvanoplastic impressions may also be obtained in this bath. The current need only be weak.

RUSTY GRINDSTONES.—Some one has asked the *Blacksmith and Wheelwright* for information in regard to his grindstones which became rusty and refused to cut hard steel. Mr. W. L. Hardy gives a remedy as follows: "I have a small stone that acts the same way, and my remedy is to turn it off slightly with a piece of soft iron; a piece of three-eighths inch rod answers very well, using plenty of water. I have a 'kink' for this. Instead of holding the rod at right angles to the axis of stone, I incline the free end in the direction I wish to move it, and roll it on the rest block; this feeds the rod in as fast as it is ground off, and prevents jabbing holes in the face of the stone. I have noticed that when an emery wheel used for grinding hard steel becomes dull, grinding a piece of cast iron on it will cause it to again cut hard steel freely."

GRANULATING ORE.—At the recent annual meeting of the American Institute of Mining Engineers, Mr. W. H. Hoffman of the Croton mines, Brewsters, N. Y., described the Sturtevant mill, the features of which are widely known. He reported that on well roasted Croton ore he can granulate to 12 mesh 24 gross tons per hour in a 20-inch mill, with an expenditure of 96 horse power. The cost for renewals compares as follows with the different appliances used at various times at the Croton mines: Common single-jaw Blake soft-steel cover rolls, 1½ cents; Blake multiple crusher, 3 cents; rolls with chilled cast iron covers, 4-12 cents; Buchanan rolls with soft-steel covers, 2 cents; Sturtevant mill ½ cent per ton of rock.

MAGNETIC CONCENTRATION.—During a discussion at the late meeting of the American Institute of Mining Engineers, E. C. Pechin, Dr. Raymond and John Birkinbine referred particularly to titaniferous deposits, their magnitude and persistency geologically. President Birkinbine reported that efforts were being made to remove the ilmenite in titaniferous magnetites by magnetic concentration. In one instance fair success has been attained, about 70 per cent of the titanium being eliminated, while the amount of iron carried off in the tailings was relatively small.—*Iron Age.*

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W. B. EWER, SENIOR EDITOR

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SAN FRANCISCO:

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See Advertising Columns.

Gold and Silver Mining.

The silver mining rushes in Colorado should not entice any miners away from this State. Silver mining camps grow slowly. It takes several years to open and equip the mines, even after they pass from the ownership of the prospector and discover into that of corporations. After the first great excitement in a silver camp things are generally slow for a long period. In gold mining rushes, it is different, for in such cases the claims are apt to begin paying at once, and poor miners have as good a chance as anybody. Moreover, there is a good deal of advertising of Colorado in these new camps. Very high assays of ore are telegraphed all over the country, but they may be from specimens only. None of these mines are yet opened enough to give much employment to miners.

California's gold is greatly in demand in these days and will become more so. Silver mining is not as profitable as formerly, owing to the great discount on the metal. Should Congress finally give a good appropriation for debris dams in this State, and hydraulic mining be resumed, then California mining interests will revive and miners be better off here than in any mining State of the Union. And it looks as if this were going to be the case.

The Miners and Congress.

The success of the Miners' Committee at Washington in drawing such attention to the condition of the hydraulic mining in California, as to obtain a report from the Committee of Mines and Mining favoring an appropriation of \$450,000 for debris dams, is highly encouraging. It was feared a favorable report would be difficult to obtain from this Committee. Of course, the report is still to be dealt with in the House itself, and the amount may be cut down. But having been presented with the unanimous endorsement of the Committee, the bill has good chances to pass. Even if the amount is reduced, a start will be made in the right direction, and somewhat sooner than many expected.

The fact that such favorable consideration has been given to the pleas of the miners, before the committees, shows that an interest has been aroused on the question which did not previously exist. Only one side of this question has before been argued, and the representations heretofore made to Congress relating to this subject have been factional in their nature only.

During this session the miners' side of the case has been presented fairly and dispassionately. Their former opponents having agreed to assist the miners in certain specific demands, made upon a stated basis, the controversial features were absent. Therefore, it has been possible to obtain some encouragement. As long as two factions were opposing each other, nothing could be accomplished.

It was a wise move, too, for the Miners' Convention to send on a special committee in their interest. These gentlemen have not only been able to explain affairs properly to Congressmen and Committees, but they have enlisted the aid of the coast delegation. The Senators and Congressmen from California have given every possible aid. Senator Felton and Congressman McKenna and Caminetti in particular, have given valuable assistance. Mr. Geary had a bill of his own, local in its nature to some extent, which he did not care to see displaced, but his work has been in the same direction as the others after all.

Efforts will now be made to get an early hearing for the bill, while the facts presented are fresh in everybody's mind. It is important that work on the proposed dams commence at as early a date as possible. Preparations for mining would commence shortly should the bill pass. Messrs. Searles, Luttrell, Hobson and McMurray, the Miners' Committee, have worked hard to present their case properly, and have certainly succeeded very well as far as they have gone, and they deserve the hearty thanks of the California miners. They have still much to do, however, and must be kept at their post until ultimate success is reached. The Miners' Associations throughout the State must lend as much financial assistance as possible to the State Association, in order that this important delegation or committee may be kept at work.

Another thing, too, miners should remember: The bill has not passed yet, and this would be the very worst of times to start up any hydraulic mining. These mines should all be absolutely closed, as agreed to, until proper provisions are made which will again let them work without any danger of the injury formerly complained of.

THE COEUR D'ALENE MINES.—The Mine Owners' Association of Coeur d'Alene, at a meeting held Friday night in Wallace, Idaho, decided to resume work throughout that silver and lead section. The railroads have restored the old rates on ore shipments to the East, being a reduction of \$2 per ton. Work will be resumed about April 1st if a sufficient number of miners can be had. When the mines closed down, 2000 miners left the country. Heretofore, wages

have been \$3.50 per day alike to miners and carmen, but in the future the mine owners declare that they will pay this rate to miners only and \$3 to carmen.

Gold Mining Results.

People often wonder why it is that so little is heard of the details of results in California gold mining. We learn of the aggregate yield of the year, but as to profit or loss, very little is published.

The reason for this is simple. Most of the gold mines are the property of individuals or private companies who conduct them as legitimate business enterprises, and not for stock-jobbing purposes. When mining companies go to the public with stock to sell, then the public has a right to know all about their affairs. But if it is carried on by private owners, they do as they like about making results known.

Very few indeed, of the gold mines of this State have stock for sale unless, perhaps, at the inception of work. But the stock is not promiscuously dealt in by the general public. In the Stock Exchange of this city very few California mines are even listed or called. Stock dealing here is mainly confined to silver mines. The gold mines of the State are not much affected one way or the other by the variations of the market here.

The owners of the gold mines are therefore justified in keeping the condition of their mines to themselves if they see fit. There is no occasion to misrepresent affairs, or to herald abroad strikes or finds of rich ore. The better the mines pay, the less said about them by the owners, as a general thing. We hear more about prospects and newly developed claims than the old ones which are paying. California is less advertised as a mining country than it might be were these conditions not prevalent, for with no stock to sell, there is no occasion to "whoop up" the mines.

Restraining Dams.

The news that a favorable report had been made and an appropriation of \$450,000 recommended for debris dams, was received with rejoicing in the mountain counties. At Nevada City, a committee of Hydraulic Parlor, Native Sons of the Golden West, fired a national salute in honor of the event.

If Congress will now accept the recommendation of the Committee on Mines and Mining, and pass the bill, there will be a "boom" in the mining sections of this State within the next few months such as has not been experienced for years. There will then be reason to expect a return of former prosperity in the gravel-mining regions of California, which will be felt all over the State.

The time is ripe for this action. Gold is scarce and in demand. Our mines have plenty of it, if we are only permitted to get it out. With the recommendations of the Government engineers carried out, the mines can be worked without injury to any other interests. It has not taken us very long to prove this to the Congressional Committees. A simple presentation of the facts, properly established, has brought about a change of sentiment. It only remains now for the main body of Congress to adopt the committee's report. Then, in a few months, the claims can be got ready. The dams need not be entirely completed for the mines to begin. In fact, the engineers suggest only raising them about ten feet a year, so that it need not be very long before active operations can be commenced.

THE EUREKA mine near Hornitos, Mariposa Co., has been bonded to T. D. Callahan, and the Brooks mine has been bonded to J. E. Spencer. Both these mines will be worked at once. They have been closed down some time.

California Minerals and the Fair.

The California World's Fair Commission has decided to set aside the sum of \$15,000 for the Department of Mines and Mining. It was unfortunate that Robert McMurray, one of the Commissioners, was absent in Washington, helping the miners' cause there, or it is probable he could have prevailed upon the committee to increase this amount. However, agriculture gets only \$17,000, and horticulture \$20,000; machinery and manufactures get only \$500 each, so that mining fares passably well. Mr. McMurray had hoped to get \$40,000 for mining out of the \$300,000 appropriated by the State.

This settles one thing apparently. It will not be possible to attempt to make any new collections of minerals, etc. It will take pretty much all of the amount stated to send on the collection of the State Mining Bureau, display it and provide for its care. Little beyond this can be done. Men will have to be placed in charge of the display, and they must be paid out of this amount. Freight and other expenses will have to be paid.

THE MINING AND SCIENTIFIC PRESS suggested months ago that the State Mining Bureau collection be sent to Chicago. It belongs to the State anyhow, and we can readily spare it from the city during the Chicago fair.

The minerals are all identified, classified and labeled, and are in much better shape than any other lot could be without great labor and expense. The cases of the Bureau are well filled, and the collection is much larger than that possessed by any other State. It will help out the California mineral display greatly. It is understood that this collection will be sent under the care of the State Mineralogist or some of his assistants.

THE ASTRONOMICAL SOCIETY OF THE PACIFIC holds its annual meeting at the Hall of the Academy of Sciences on Saturday, March 26th. The annual election of a Board of 11 Directors and a Committee on Publication will be held from 8:15 to 9 P. M. The following papers will be presented: 1. Annual address by the retiring President, Hon. Wm. M. Pierson, F. R. A. S., San Francisco. 2. The Sun's Motion in Space, by W. H. S. Monck, F. R. A. S., Dublin. 3. How to find Celestial Objects with an Equatorial Telescope without the Aid of a Sidereal Timepiece, by Chas. Burckhalter, F. R. A. S., Oakland. 4. Astronomical Observations in 1891, by Torvald Kohl, Odder, Denmark. 5. The Harvard College Observatory Astronomical Expedition to Peru, by Mrs. M. Fleming of Cambridge. 6. Discovery of New Rills on the Moon on Lick Observatory Negatives, by Prof. L. Weinek of Prague.

COPPER has gone up about to 12 cents a pound of late, and the copper companies, by united action in restricting production, hope to give the metal still more of a lift. As before stated in the PRESS, the larger producers have come to an agreement as to the amount each shall turn out. The Montana and Michigan companies are the largest producers, and the Arizona next. Not very long ago copper was only 10½ cents, but the price in New York is now 12 cents.

WORK on the Pacific Mail Co.'s new steamer, now building at the Union Iron Works, is progressing very favorably. Her dimensions are as follows: Length between perpendiculars, 326 feet; over all, 345 feet; beams, 45 feet; depth of hold, 27½ feet. She will be supplied with six steel boilers, each 12 feet in diameter and 11½ feet in length.

THE Placer County Miners' Association now has 616 members, thirteen of whom are ladies.

Coal-Sorting Machinery.

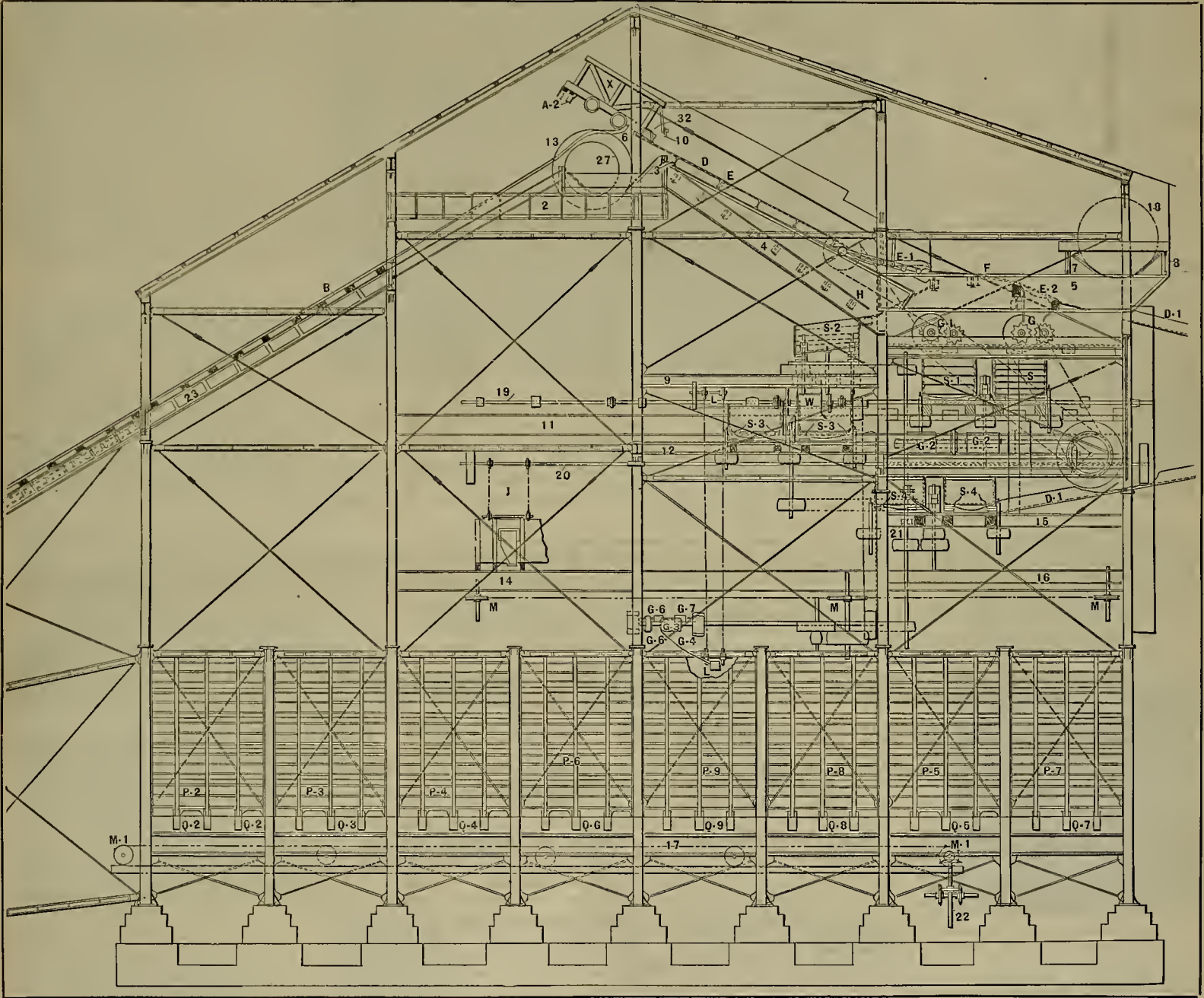
In describing the arrangements for handling the coal at the iron breaker at Drifton, in recent numbers of the PRESS, the methods of dumping the cars have been plainly shown. The plane upon which the coal is hoisted is a pin-connected structure as shown in the accompanying plate, the posts, struts and tie rods being of the same general character as those employed in the lump chute and the rest of the building. Each track is carried on two riveted girders 18 inches high, which are connected together 27½ feet apart by division plates and tie rods. Over

S and S; 12, fifteen-inch I-beam carrying timbers under wet-screen; 13, eight-foot sheaves at dump for gunboat rope; 14, twenty-four-inch I-beam carrying east end of jig tanks; 15, I-beam carrying broken-coal screens S; 16, fifteen-inch I-beam; 17, twenty four-inch built up I-beam under deep end of pockets; 18, eight-foot sheaves nearest to hoisting engines, north side; 19, line shaft from Westinghouse engine for driving jigs; 20, line shaft for driving drags taking coal from jigs; 21, pulley from which gyrating separator K, is driven; 22, bevel wheel shaft for driving supplementary coal drag M; 23, beams for gunboat and plane;

The Caminetti Bill in Congress.

The Committee on Mines and Mining have agreed to report the recommendation of \$450,000 for the Osminetti Mining Debris bill, for the relief of the hydraulic miners of California. The only point upon which there was any trouble was the amount of the appropriation. Stevenson of Michigan, who is also a member of the River and Harbor Committee, and had not attended any of the former meetings to consider the mining bill, showed up to day and moved to fix the sum allowed at \$200,000. Mr. Caminetti had been authorized by several absent members to cast their votes in favor of \$450,000, but the

secure a day from the Committee on Rules for its consideration. As to the ultimate chances of the bill in the House, it is hard to speak with certainty. There is no visible opposition now—that is to say, everybody seems willing, as an abstract proposition, to give the miner a show, but the bill is very long and complicated, and when it comes to be considered in detail, there is danger of trouble over particular features. Mr. Caminetti is confident that the only point about which there is any uncertainty is the appropriation. The bill, he thinks, is sure to pass. As to the appropriation, he hopes to be able to convince the House that the miners are asking nothing unreasonable. "I take my stand," he says, "upon the



SIDE ELEVATION OF BREAKER FOR HANDLING AND SIZING COAL.

the tops of these, wooden sills are laid, which are also shown in the drawing. Each gun-boat track is immediately over a pair of girders. The main structure, or that part of the breaker which contains the machinery, is built immediately over the pockets.

The side elevation of the breaker is shown in the plate. The numbered parts are as follows: 2, built-up I-beam carrying dump; 3, large girder at top of mud-screen pocket; 4, taper built-up girder, forming sides of mud-screen pocket H, and carrying dump chute and bars; 5, built-up I-beam carrying platform E; 6, check horn on end of mine-car rail on dump C; 7, inside girder carrying sheaves (18); 8, outside girder carrying sheaves (18); 9, fifteen-inch I-beam carrying mud-screen S; 10, latch on tail-gate of mine-car; 11, twenty-four-inch I-beam carrying driving mechanism of jigs, also screens

24, slate chute under jigs; 27, five-foot sheave or dump for barney rope. Pare the lump coal chutes for various sizes, and Q are the loading chutes.

W. H. STORMS, representing the MINING AND SCIENTIFIC PRESS, is in town. The PRESS is under the very able editorial management of Cbas. G. Yale, a gentleman widely known in newspaper and mining circles, and is vastly improved. It is a journal all Pacific Coast mining men should read.—Grass Valley Tidings.

SILVER PURCHASES.—The offers of silver to the Treasury Department aggregated 921,000 ounces. The amount purchased was 605,000 ounces at .8987 to .8984. The price per ounce paid by the Government on Monday for silver is the lowest figure at which the Government has ever purchased the metal,

chairman ruled that no proxies could go.

The committee adopted the \$200,000 proposition. Mr. Caminetti moved a reconsideration, and the absent members dropping in subsequently, the \$450,000 appropriation was carried.

One member objected to the provision forbidding the employment of Chinese labor on the works. Acting under instructions from the miners' delegation, the committee waived that point. A country editor of the committee protested on behalf of his guild against the section requiring notices to be advertised in the city papers. He was pacified by adding "a paper in the county containing the mine to be opened."

The provision levying a 3 per cent tax on the miners was added, and with these amendments and some slight verbal changes the bill was unanimously agreed to, and Mr. Caminetti was instructed to prepare the report.

He is now engaged on this work, but does not expect to bring the bill into the House until after the River and Harbor bill is reported. After that he hopes to be able to

conclusions of the Government engineers. There are the accumulations of 40 years of mining, as well as the result of natural erosion, which will have to be taken care of sooner or later. If they are not retained in the mountains, they will have to be dredged out of the river channels in the valleys. The Government will save money by doing the work at the right end, and by means of the 3 per cent tax it will be able to pay itself back at the expense of the miners. The miners are not asking charity—they are proposing to give it."

THE Jenckes Machine Co., Sherbrooke, P. Q., Canada, have been appointed the sole Canadian representatives of the American Diamond Rock Boring Co., 15 Cortlandt St., New York, manufacturers of the celebrated Diamond Rock Drills for Tunneling, Mining and other rock-boring purposes. The arrangement provides for the manufacture of these machines at Sherbrooke, and the Jenckes Machine Co. will thus be in a position to supply the demand for them promptly throughout the whole Dominion.

The Game Birds of Lassen County.

We find in the *Weekly Mail* of Susanville, Lassen county, a very interesting popular article on the game birds of that portion of California, and as the same species are visitants or residents also in other parts of the State, the account will be generally interesting.

While the natural histories placed in the hands of our young people give much information concerning the game birds of all countries, there is no list showing the child what birds are found here. In this article we have called attention to the principal game birds of this county, giving at the same time some data about their size, color, habits, number of young reared, etc.

These facts should be placed in the hands of every child in the county who is old enough to read well, and each schoolroom ought to contain this matter in some conspicuous form for the use of both teacher and pupils.

One of the finest game birds of Lassen is the dusky grouse which lives in the mountains, while the sage hen, another grouse, inhabits the valleys. The dusky grouse, during the summer, feeds upon berries, seeds and grain, but in the winter, when the mountains are covered with snow, it lives upon the buds of the fir trees. This grouse is about 20 inches long, is dark brown above and lead color beneath. These birds frequent the roughest and most difficult ground, and are not easy to find. Their flesh is dark colored, but is sweet and delicious.

The sage hen is another of the grouse family, and is one of the largest and finest. They have a varied plumage of black, brown, gray and white, their tails are long and pointed and contain 20 feathers. The male bird weighs five or six pounds, but the female is fully a third smaller. They do not fly readily when disturbed, but squat down or attempt to hide, apparently thinking they will not be seen. They fly with a loud whirr like the rest of the grouse family, but their flight is slow and laborious compared with the dusky grouse. They live in the dry, treeless and waterless plains of the Great Basin, but here are found both in the open valleys and in the timbered hills. The male bird has large, flame-colored patches on the sides of its neck that are greatly distended during the mating season, but these are hidden by his feathers at other periods. They build their nests on the ground, beneath low bushes or high tufts of grass, and the mother bird lays from 13 to 17 eggs. These require from 21 to 22 days to hatch.

Owing to their food being very largely the leaves of the bitter sage brush, the flesh of the old birds, especially in winter, tastes very strong; but the young bird, in the fall of the year, is delicious. Hunters assert that by emptying the stomach and crop of the bird as soon as killed, the strong taste of the flesh is avoided. One curious fact about this grouse is that it has no gizzard like other birds.

THE QUAIL.

A third favorite game bird is the quail, and this is found in nearly every part of Lassen, from the open valleys to the highest mountains. These birds associate in flocks of from 15 to 20, and live upon seeds, berries and insects. Of the latter, they destroy immense numbers. They do not perch upon trees like other quail, but roost upon the ground. The upper parts of the birds are olive brown, the breast and neck lead colored and the abdomen white. They have two long, straight feathers rising from the back of the head like a plume.

Their nests are formed upon the ground, and from 10 to 15 eggs are usually laid, but some nests have been found with 20.

A quail, when shut up and the eggs taken away each day, has been known to lay in one season over 70 eggs. These eggs are speckled, like the eggs of a turkey. One of the most curious facts about the roosting of the mountain quail is its habit of watching against danger. The birds will all form in a circle, standing some distance apart, then they will back up till their tails touch each other and then they drop upon the ground, knowing that nothing can approach them without being seen or heard by some of the flock.

When the flock has been scattered, owing to an alarm, the birds call their mates with a clear, shrill whistle, much like a man whistling to his dog, and hunters take advantage of this to call these birds, for the purpose of killing them.

Each spring and fall there are many swans, for a short time, in the various valleys and lakes of the country. These birds stop for a few days to rest and feed, on their annual migrations north to Idaho, parts of Washington, and to British Columbia, where they breed and rear their young. Of the swans, there are but two varieties that visit our county—the American and the trumpeter. The flesh of the young birds, called Cygnets, is palatable; but that of the old swans is tough and stringy. The American species is five feet long from the point of its bill to the tip of its tail, and six feet across its extended wings. Its plumage is snow white, but the feet and bill are black.

The trumpeter swan receives its name from a harsh, loud cry that it gives, and this is a larger bird than the American, measuring nearly five inches longer.

THE GESE.

These birds pass through our county twice a year, both in going to their northern breeding grounds and south to their winter pastures. All varieties are noted for their sharp ears, sharp eyes and keen smell. They migrate in flocks of from 10 to 100. They always, like the swans and ducks, fly in the form of a triangle, with the strong and tough old ganders in the lead. Geese can readily detect noises that indicate danger. We have counted 29 flocks of geese in the air, at one time, moving toward the north. The largest and finest for table use is what is known as the "honkers," or Oregon geese. These on the Atlantic Coast are known as Canada geese. They are 40 inches long, and a very large and fat one will weigh 16 pounds, or as much as a big turkey. The honkers usually fly by themselves, but the other geese may be seen in the same flock. The head, neck, feet and bill are black.

The brants are only about half the size of honkers; they are a dark-grayish goose, with black legs and feet.

The speckled breasts are next to the honkers in size, and are the next best for the table. They have pale or yellowish legs and feet.

The snow geese is a fourth species that is often seen. They have reddish-yellow legs and feet. While their plumage is snowy white and they are very attractive looking birds, they are the poorest game bird among the ducks and geese that frequent our lakes.

In the Sacramento valley, all these geese make their homes in the vast tule swamps, but fly to the grain fields each day, and have to be frightened away by men who shoot at them to keep them from eating up the grain. In our mountain valleys, occasionally, a goose will make her nest and rear her young, but this is seldom the case, and when it occurs, hunters think that the bird is a wounded one that is unable to keep up with its fellows in their northern migrations. In returning from the north, the geese make short halts, while the ducks remain in Modoc, Plumas and Lassen until about the second snowstorm, when they take wing for the Sacramento and San Joaquin valleys.

DUCKS.

There are found in California some 22 species of ducks, and of these, eight or ten visit the lakes, streams and ponds of Lassen each year. In size, beauty, and graceful attitude when swimming, the mallard duck stands at the head of the list. He is not so fine a table bird as the canvasback, but these are seldom seen here. The mallard is 24 inches long and weighs from four to four and a half pounds. The drake is handsomely marked with green, chestnut and white. The female is brown and destitute of the bright colors of the drake. The female makes her nest upon the ground amid rushes or weeds, or sometimes in a hollow log. The eggs vary from eight to fourteen in number and the ducklings are very active and alert from the moment they are hatched. The nests are often found fully half a mile from a stream or lake, yet the day the little ducks are hatched the old bird manages to escort all to the water, upon which they launch themselves with fearlessness. While the female is sitting the male bird remains near by, as if to watch for danger. The mallards are shy and cautious, and they fly in a circle several times around the spot where they intend to alight. If there is the slightest thing that looks suspicious, they will seek another spot. They have sentinels posted while feeding, and by old hunters it is said some of the flock are awake at all times during sleeping hours. They feed mostly at night and seek the waters of the creeks and streams during the day. A peculiarity of this duck is that the drake sits on the eggs during the absence of the duck while she is feeding.

A few mallards rear their young in our valleys, but the greater number go much farther north. They pass through our county in March and April going north and return in October or November.

The canvasback is 20 inches long and weighs about three pounds. It feeds upon wild celery and dives to get its food. It is a strong and rapid flyer, and we have seen this bird in the Sacramento valley rise some distance behind a railroad train in motion, follow and overtake the train and then pass ahead of it very rapidly. It is one of the most expert divers known, and remaining under water longer than a mud hen, our boys will understand that few birds can beat it diving. It goes as far as Alaska to breed during the summer.

The redhead is often sold for the canvasback and few can tell any difference in the taste. The redhead has a blue bill and is a smaller duck than the canvasback.

The duck most frequently seen is known as the Widgeon or "bally." This duck has a white patch on its head and in many localities is known as the Baldpate. It is 18 or 19 inches long and weighs about two and a half pounds. The head and neck is a reddish yellow, the forehead of the body a brownish red, and the under parts are white. The tail is brown and contains 14 feathers, while its bill is blue and has a black tip. The natural histories assert that this bird is a day feeder, but old hunters say that it feeds both during the day and at night. It gives a clear whistle that may be heard some distance. They can neither dive as quickly nor fly as swiftly as the mallards or other ducks we have named. About one-fourth of the ducks that are killed here are Widgeons.

The Teal is not so large as the other ducks already named but it is a fine table bird. There are two species, the green winged and the blue winged Teal. They are 14 or 15 inches long and weigh one and a half pounds. It has a narrow bill as long as its head and pointed wings. The head and shoulders are chestnut colored with a green stripe on the neck, while the under parts of the bird are white. It is one of the first birds to return from their northern migrations. Johnson's Natural History, one of the newest and most complete ever published, says that the blue winged Teal is not found on this coast, but this is evidently taken from a very early report upon the birds of this coast, where such a statement is made. It is not a fact, for there are thousands of blue winged Teal ducks found all over California. It is a less shy and suspicious bird than the green winged duck and more easily shot. About 25 per cent of the ducks killed in Lassen are Teal ducks. The female duck lays from 11 to 17 eggs but as high as nineteen have been taken from a single nest.

The summer or wood duck is the most beautiful of the duck family found here. It receives its name of summer duck because the duck remains here during the summer, while it gets its name of wood duck from its habit of making its nest in trees or stumps. Dr. Brewer says that it is conspicuous for the swiftness, ease and elegance of its flight. It can pass through woods and among the branches of the trees with as much facility as the wild pigeon. Its splendid plumage shows a great variety of rich colors. Instead of congregating in flocks, like the Teals and Widgeons, the wood ducks are usually seen in little flocks of three or four; often they go in pairs and occasionally they are seen alone.

They live mostly upon acorns and will eat so greedily that they cannot swallow another one, yet will hold one in their mouths. They seek the deep pools along the creeks, where they are hidden by the dense bushes of the banks,

and are shy and difficult to approach. They build their nests in hollow trees or stumps, and when the young are hatched the mother bird carries the little ones down to the ground by holding them by the back or wing with her bill. Hunters assert that the ducklings will ride to the ground on the back of the mother. The old bird lays from 12 to 20 eggs in a nest and some nests have been found with as many as 23 eggs in them.

Another duck found here is the Spoonbill, which derives its name from its large, flat bill. This duck is 20 inches long and weighs nearly two pounds. The head and neck are green, the back brown and the tail black. This duck feeds largely upon worms, frogs, etc. It makes its nest on the ground, lays from 10 to 12 eggs and rears its young in the marshes of the far north. It is a shy, suspicious, intelligent bird, with great powers of flight. But few of them are killed by hunters.

The Gadwall or Grey duck is 19 inches long and weighs two and a half pounds. It is a quick diver and rapid flyer, feeds during the day as well as at night, and makes its home mostly amid pools shut in by rushes and high weeds.

The Springtail or Pintail is a wilder and more wary bird than the mallard and not easily approached. It rides the water as buoyantly as a cork and bounds from it very quickly. Its length is 30 inches, its weight three pounds. It has a long and narrow bill and a pointed tail, the feathers of which slightly curl. The head and neck is a dark brown, glossed with green and purple. The tip of the tail is coal black while the breast is pure white, the wings are bluish grey while the bill is black above and blue beneath.

The Butter duck is a small and very fat little duck, not half the size of the mallard, and is common along most of the small streams of this State. It feeds on grass and grain and is so quick a diver that it is almost impossible to kill it, unless the hunter shoots it upon the wing or watches till the bird just puts its head out of the water. Its body is dark with white underneath and the bill is blue.

OTHER BIRDS.

The robin is unfortunately considered by many a game bird and suffers accordingly. The top and sides of the head are nearly black, the under parts of the body a chestnut brown, and the wings a dark brown. The bill is yellow. These birds are migratory, like the ducks and geese, and go far south during the winter. They do not make their nests or hatch their eggs lower than an altitude of about 3000 feet. Their nests are built in trees, four or five eggs are laid, and these eggs are dark bluish green. Two broods are often raised in one season. Their nest is composed of three layers, the outside of roots, shavings, etc., then a layer of leaves, moss and grass, and this is cemented by mud. Inside of this is a soft lining of fine, dry grass. They eat many insects and should be protected by every farmer and fruit grower.

The dove, like the robin, is migratory, going far south in winter. They are so common that any description of them would be useless. The nest consists of a few twigs carelessly placed together, and in this two eggs are laid.

While the blackbird and the lark are occasionally killed for game, they should not be classed among the list of game birds and descriptions of them are omitted.

The band-tailed pigeon is a large and beautiful bird, loving the dense woods of our mountains. The eggs are white and, like the doves, they lay but two before hatching. They collect in Southern Oregon in great flocks, but here only a limited number are ever seen together. This bird is 16 inches long, it feeds upon acorns and berries and furnishes a delicious table fowl.

The sandhill crane, when young, is a fine table fowl. Their food consists mostly of roots and plants. This bird stands nearly five feet high, owing to its long, stilt-like legs. They breed in Oregon and farther north and return before winter sets in. They are often tamed and kept as pets.

The Great Blue Heron is nearly as tall as the crane, but is smaller in its body. Owing to living mostly on fish it is rarely eaten except when young. The bird is found only along the streams and marshes, where it finds its favorite food. It builds its nest in trees and seeks its food at night. It is said of this bird that the feathers upon its breast give forth a bright light at night that attracts the fish toward the heron.

The Golden Plover is not infrequently killed and is a delicate table bird. Its body is a brownish black with yellow spots, while the under part of the body is almost black. Farther east they frequent grassy plains in large flocks. They are larger than the Mountain Plover which is found here, but are no finer eating. The Mountain Plover is a brownish gray bird, frequenting the dry plains of the Great Basin in pairs, and comes west of the Sierras during the winter. The length of the Plover is about ten inches, while its wings spread a foot. Both of these birds vary greatly in plumage during different seasons of the year.

The Grass Plover, about the size of a dove and a good table bird, is found here at times.

The Snipes are the best small game bird found here. They frequent the low marshy sections or wet fields, where they feed upon worms and insects. The female lays four pale greenish grey eggs with brown blotches upon them. One peculiarity of the snipe is the long bill, which is very sensitive, so that the bird can tell when probing with it in the mud whether the object it has touched is fit for eating or not.

The long billed Curlew is the largest of the snipe family, frequently measuring 18 inches without its bill, which is seven or eight inches long. The bird weighs about two pounds and is a fine game bird. Like the other members of this family, it frequents the low, wet, marshy grounds or flats, where it feeds upon insects and worms. They are, perhaps, more abundant on the Pit river plains than in any other part of the State. Like all the snipe family, the nests are placed on the marshy lands, four olive green eggs are laid by the female snipe, and the young are quick to run about when hatched from the shell.

Eagle lake is a favorite resting place for ducks and geese in their northern and southern migrations, and here in spring and fall large numbers of these birds can be found.

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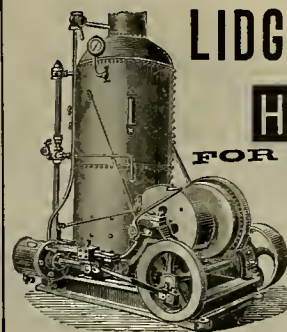
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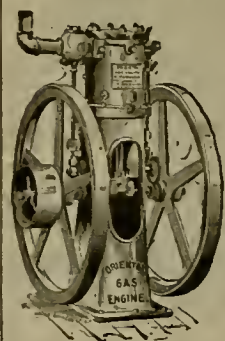
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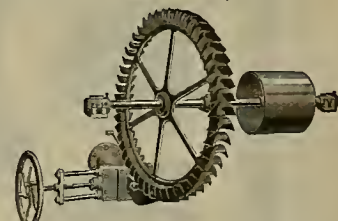
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Any stock upon which this assessment shall remain unpaid on the 15th day of April, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 9th day of May, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.
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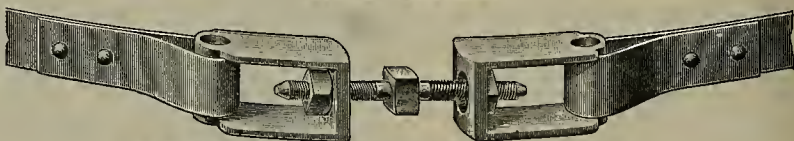
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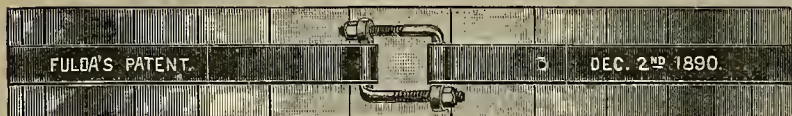
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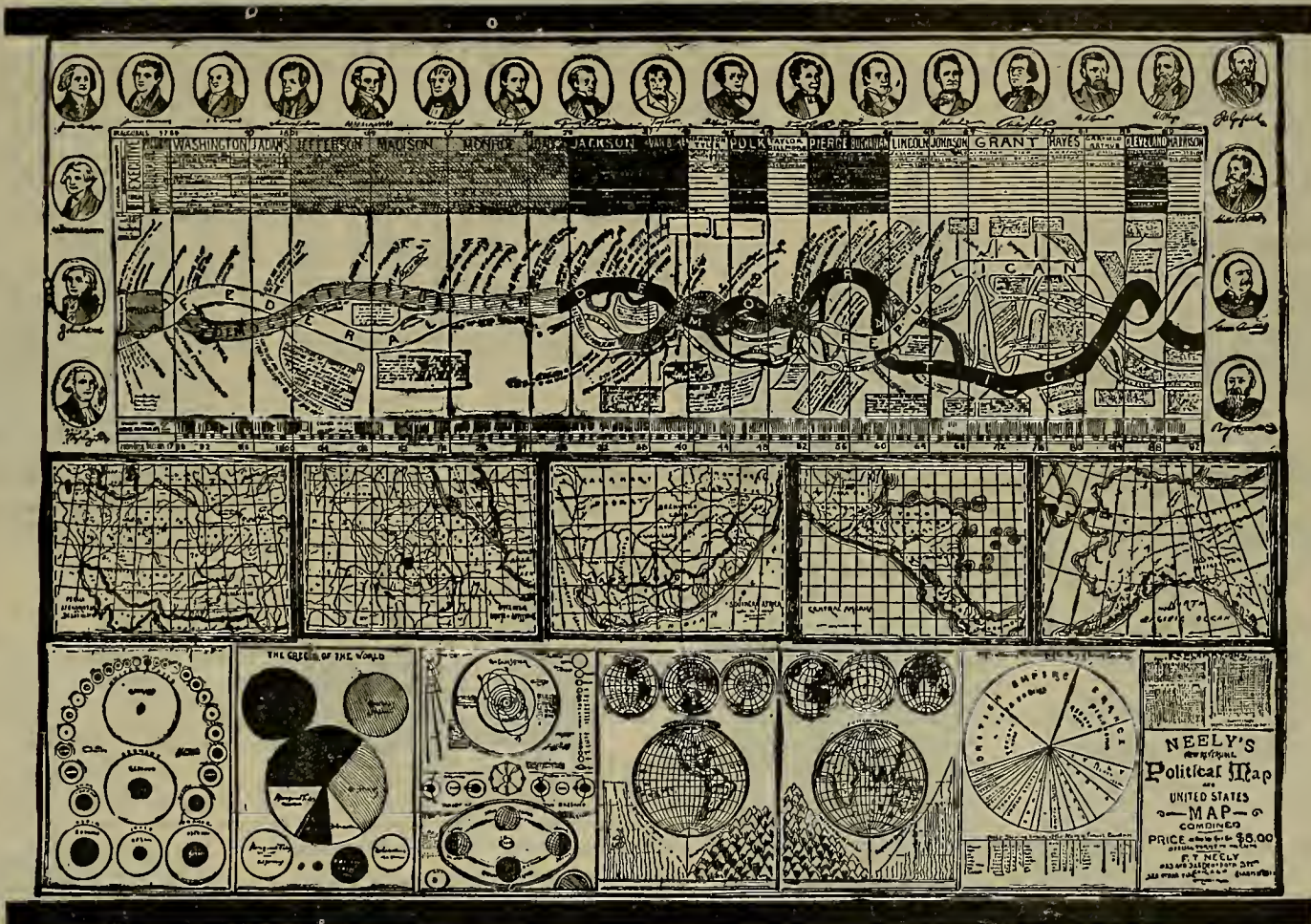
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III. SOURCES OF CURRENT. CHAPTER III. GALVANIC ELEMENTS, THERMO-PILE, MAGNETO AND DYNAMO-ELECTRIC MACHINE.
IV. PRACTICAL PART. CHAPTER IV. ARRANGEMENT OF ELECTRO-PLATING ESTABLISHMENTS IN GENERAL. ELECTRO-PLATING ARRANGEMENTS IN PARTICULAR. V. TREATMENT OF THE METALLIC ARTICLES. (a) Mechanical Treatment; (b) Chemical Treatment. VI. PROCESSES OF ELECTRO-DEPOSITION: REDUCTION OF METALS WITHOUT A BATTERY (Electro-Deposition by Contact). VII. DEPOSITION OF NICKEL AND COBALT. 1. Nickeling. 2. Coating. VIII. DEPOSITION OF COPPER, BRASS AND BRONZE. 1. Coppering; 2. Brassing (Cupreous Deposit); 3. Bronzing. IX. DEPOSITION OF SILVER. X. DEPOSITION OF GOLD. XI. DEPOSITION OF PLATINUM AND PALLADIUM. 1. Deposition of Platinum; 2. Deposition of Palladium. XII. DEPOSITION OF TIN, ZINC, LEAD AND IRON. 1. Deposition of Tin; 2. Deposition of Zinc; 3. Deposition of Lead; 4. Deposition of Iron (Steeling). XIII. DEPOSITION OF ANTIMONY, ARSENIC AND ALUMINUM. 1. Deposition of Antimony; 2. Deposition of Arsenic; 3. Deposition of Aluminum. XIV. GALVANOPLASTY (Reproduction). 1. Galvanoplastic Deposition in the Cell Apparatus; 2. Galvanoplastic Deposition by the Battery and Dynamo Machine. XV. COLORING, PLATING, OXIDIZING, ETC., OF METALS. LACQUERS. XVI. APPARATUS AND INSTRUMENTS. XVII. HYGIENIC RULES FOR THE WORKSHOP. XVIII. CHEMICAL PRODUCTS USED IN THE ELECTRO-PLATING ART. XIX. USEFUL TABLES. INDEX.

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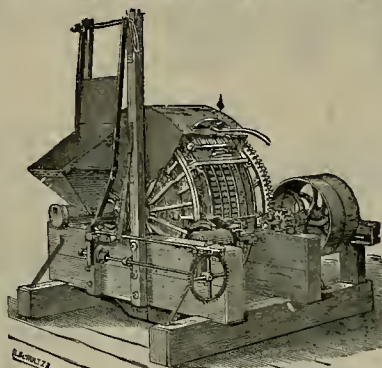
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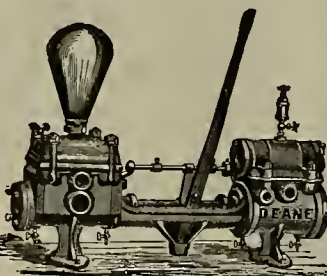
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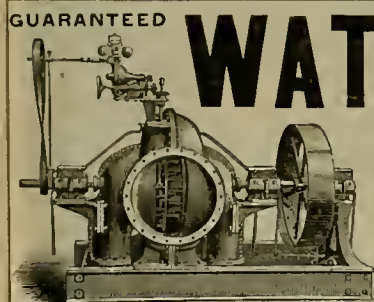
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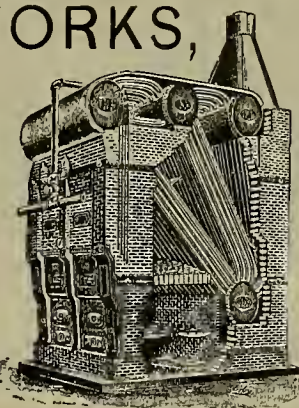


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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 24, 1892.

So far the weather for growing crops could not have been better ordered to secure a large return. Everything warrants the assertion that California and this coast in general, is on the eve of a more prosperous season than ever before enjoyed. This opinion is emphasized in the fact that the various lumber camps have arranged to increase their cuts, so as to meet an expected enlarged demand for lumber, for improvement purposes. Mr. Fillmore, general superintendent of the South Pacific Coast Railroad, says that his line will probably handle all of from two to three times more lumber in this year than they did in last year, and that the increased demand will come chiefly from agricultural districts. The favorable position of the mining debris bill as reported by telegraph from Washington, is cause for congratulation in its passage by Congress is almost assured, which if it becomes an accomplished fact will have a decidedly stimulating effect on our various industries, either directly or indirectly. Active railroad construction this year promises to be on a much larger scale than was witnessed last year.

The local money market continues easy with a plethora of funds reported, but if present signs do not fail a large increased demand for funds will set in soon from the agricultural districts, which will enlarge as the season advances. It is generally claimed that to move the wool, fruit, cereal and other products larger sums of money will be required this year than has been employed at any time within the history of the trade of this State.

MEXICAN DOLLARS—The market is weak at around 77 cts. The weak and declining markets for silver unsettle Mexicans.

QUICKSILVER—Receipts the past week aggregate 414 flasks. There was also received by overland railroad the past week 100 flasks, while in last month the shipments eastward aggregated 8 tons—5 tons from San Francisco, 2 tons from San Jose and 1 ton from Sacramento. The market is barely steady.

SILVER—The market is an enigma and difficult to solve, for with the United States more than absorbing all its products, mines shutting down and a certainty that Congress will pass a free-coinage bill, prices at home and abroad go down. With representatives of foreign banks, to whom we have gone for information on the subject, there is a growing impression that silver is being manipulated in England against Americans. It may be possible that the manipulators will go too far and get themselves into a trap from which it will be impossible to get out of without heavy financial losses. English mail advices report that in London the market is without support, not even India being a buyer, but it was claimed that in April there will be better support with India a large buyer.

BORAX—The past week 1,400 cts. were received from Oregon. The market is reported easier although quotations remain nominally unchanged. Overland shipments in last month aggregate 229 tons.

LIME—Receipts the past week aggregate 4,189 bbls. The demand is free at current quotations.

ANTIMONY—The market is barely steady. Eastern mail advices report as follows: Ordinary jobbing parcels are about all that have found sale, and prices are without remarkable change. Current quotations are 10½¢ for Hallet's, 12½¢ for L.X. and 14½¢ at 15¢ for Cookson's in wholesale quantities.

LEAD—The local market is essentially unchanged. Corroders are confident of a larger general distribution this year than ever before.

TIN—Plate is going into consumption, but so far as we can learn with no new business done—all that is being consumed was purchased some time ago. Quotations for both pig and plate are more or less nominal. Eastern mail advices report a slightly better demand. London cables to Iron Age reports as follows: Demand for Tin Plate has been slightly better, with the call chiefly for Cokes for Russia and Frisco. Charcoals and Teines are still unusually slow for the season.

PIG IRON—The market continues in buyers' favor both for spot and shipment. The consumption is not only large—but increasing. The agricultural works have taken freer than ever before. London cables report a fairly strong market, but this is offset by weak freights to this port. Eastern markets are reported as follows by mail: The most conspicuous feature is the further development of a tendency to sell crude material for delivery during the whole of the year at low prices. It is a confession on the part of some makers, and notably of the largest of them, that they do not hope for any improvement for 1892. Many leading authorities in the Iron trade do not go quite so far, but there are few who have the courage to predict any improvement before midsummer. Reports from the Mahoning and Shenango valleys are growing a little more definite as to the blowing out of furnaces, and from the Lehigh and Schuylkill valleys come a similar story. But the aggregate capacity thus involved is not great, and is at least partially offset by the blowing in of three new Southern furnaces, Florence, Clarksville and Dora being named.

COPPER—The market has gained strength, as indicated by us that it would. The little boomlet is based chiefly on the understanding among the producers, to which we refer editorially. Mines which last year produced 228,000,000 lb. are going to restrict their 1892 product to 250,000,000 lb. London cable to Iron Age reports as follows: Copper has been active and strong, with an advance in prices of about £2 during the week. Better demand from home consumers has helped the market, but the chief incentive was renewed reports of restriction of output in America and of European producers having been approached by American producers with a view to joint action.

COAL—Imports the past week aggregate as follows: Departure Bay, 3023 tons; Tacoma, 6772; Cardiff, 3388; Comox, 4750; total, 17,333 tons. The market is reported weak and in buyer's favor, with quotations nominally unchanged. It now looks as if there will be a very great increase in the consumption of this city and consuming points in this State. The very large crops will bring into the

arena a larger steam tonnage on the bay and rivers, more railroad business and more business in other branches in which coal is consumed as a motor generator. Notwithstanding the outlook for a large increased consumption, yet dealers think low prices will rule owing to the prospects favoring a very large wheat crop, which, if realized, will send vessels laden with coal to this market for outward cargoes.

San Francisco Metal and Coal Market.

ANTIMONY.			THURSDAY, March 24, 1892.		
			STREET.		
Per lb.	@	14	English, lb.	16	@ 20
Refined, in car lots	8	@	Canton tool.	9	@ 9
Powdered, do.	8	@	St. Paul's tool	8	@ 9
Concentrated, do.	7 1/2	@	Pick Hammer	8	@ 10
All grades jobbing at advance.	7	@	Machinery	4	@ 5
COPPER.			TINPLATE.		
Bolt.	22	@	B. V. steel grade	14	@ 20
Sheeting.	22	@	1420, spot.	6	@ 600
Ingot, jobbing.	22	@	Charcoal, 1420.	6	@ 600
Do, wholesale.	22	@	Do roofing, 1420.	6	@ 600
Fire Box Sheets	22	@ 34	Do, do, 2012.	12	@ 1200
IRON.			P. T. TIN.		
Bar, base.	3	@	Spot #3, lb. irreg.	21	@ 21
Norway, base.	42	@ 54	ular, nominal.	21	@ 21
PIG IRON.			COAL.		
Eglington #1 ton.	25	@	Spot from L.A.	PER TON.	
Glenbrook.	25	@	Wellington.	58	@ 100
Am. Soft, No. 1.	25	@	Greta.	7	@ 25
Oregon Pig.	30	@	Nanaimo.	7	@ 25
Puget Sound.	30	@	Gilman.	6	@ 35
Clay Lane White.	24	@	Seale.	6	@ 35
Langlois.	25	@	Ocos Bay.	5	@ 50
Thorncliffe.	25	@	Cannel.	5	@ 50
Garscherrie.	25	@	Egg, hard.	14	@ 100
Barrow.	25	@	Oumberland, in sacks.	15	@ 100
Carondelet.	23	@	Do, bulk.	12	@ 100
CHROME IRON ORE.			Walsend.		
Per ton.	100	@	Scotch Split.	7	@ 50
LEAD.			Brymbo.		
Pig.	42	@	West Hartley.	7	@ 50
Bar.	5	@	TO LOAD - PER TON.		
Sheet.	71	@	Australian.	3	@ 700
Pipe.	62	@	Liverpool Steam.	7	@ 700
STEEL.			Scotch Split.		
Drop, #3 bag.	1	@	Lehigh Lump.	12	@ 100
Buck, #3 bag.	2	@	Cumberland.	12	@ 100
Obilid, do.	2	@	Egg hard.	12	@ 100
QUICKSILVER.			West Hartley.		
Home trade, pr.	43	@	English, to load.	89	@ 100
do sk.	43	@	Do, spot, in bulk.	11	@ 100
For export.	39	@	Do, in sacks.	13	@ 100

Eastern Metal Markets.

New York, March 23.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.	41	9 1/4	11 1/2	4 2 1/2	19 5/8
Friday.	41	8 3/4	11 1/2	4 2 1/2	19 7/8
Saturday.	41	8 3/4	11 1/2	4 2 1/2	19 7/8
Sunday.	41	8 3/4	11 1/2	4 2 1/2	19 7/8
Tuesday.	40 1/2	8 1/2	12 1/2	4 1/2	19 1/2
Wednesday.	40 1/2	8 1/2	12 1/2	4 1/2	19 1/2

Tin is strong and high. Lead is easy. Copper is very strong at an advance. Quicksilver is easy, as is borax. Iron continues in buyers' favor.

Mining Share Market.

SAN FRANCISCO, March 24, 1892.

The market showed more life the past week than it has exhibited for some time past. Activity commenced in Hale & Norcross shares, accepted as quite a feather in the cap of the Brokers' Combine, and also that of the Mining Stock Association. The mill ring, it is claimed, did all in its power against an up move, and with some effect. Bob Morrow's reported brokers (Wall, Lang, Stauff, and one or two others), it is said, were always on hand to down the market as soon as it showed any degree of weakness. There is no denying that outside money men are not in the market, and rightly so, for until the insiders are forced to conform to the laws under which the companies incorporated, the game will continue hullo for the rings and assessments for outsiders. Probably the mines were never before in so favorable condition for working to pay dividends or for looking as the case may be, the later will continue to prevail unless insiders are compelled for it looks as if they would not of their own volition to do justice to all stockholders by sharing the bullion produced.

The Hale & Norcross management has instituted several needed reforms, that should tell with favorable effect in the interest of outside shareholders. But the latter should not lose sight of the fact that an adjoining mine to the north of the Savage, offered by those who controlled Hale & Norcross while the latter was being looted, and that the president of the Chollar Mining Co., whose mine joins to the south end, was vice-president of H. & N. With their drifts, etc., the latter mine can be looted either from the Savage or Chollar side.

Gas Sars, the Senator's brother, experienced a change of heart? In his weekly—should be weekly letters giving, as far as he sees fit, the work, etc., done in Belcher, in Seg. Belcher, and also in Crown, he reports finding some ore. Is this done for the purpose of collecting assessments, or does he see in the Hale & Norcross election the hand-writing on the wall? Be this as it may, it is some relief to hear even of strings of ore, in these days of porphyry reports for outsiders and rich developing work secretly reported to insiders.

Probably one of the most important events that has lately taken place on the Comstock is that of testing the more refractory ore by the cyanide process, in which ex-U. S. Senator Tabor of Colorado and other capitalists are interested. The following letter published by the Denver Times gives the result of one test:

VIRGINIA, Nev., Feb. 27, 1892.

Col. T. L. Wiscall, Esq., DEAR SIR: Yours of Feb. 23d at hand. I will write at length to-morrow or next day in regard to Havens, but to-day am pressed for time. One test on Ophir ore, which is the same as Consolidated Ad Virginia, shows extraction of 84 per cent in three days' leach, 20 mesh wire screen. I have a test one of 10 mesh, and I hope to get the same results. This test shows that the ore can be worked up to 95 per cent in five days. Mr. Lyman is greatly pleased. Yours truly, D. W. BALCH.

An assessment of 50 cents was levied this morning by the Hale & Norcross directors. It looks as if the brokers who gave their proxies to the Flood-Messer combination, to vote against the Brokers' Combine, have fouled their own nests. It is claimed by mining men that in the Hale & Norcross mine there are over 10,000 tons of ore extracted and ready for hoisting and milling, yet the Flood-Messer combination has an assessment levied, and for what? The same combination wrested the control of Andes from the Billy Brown combination, since when the stock has sold considerably below the assessments that have been collected.

The share market opened barely steady this morning, and after that fell to lower figures. We still think that prices will go some higher, although the points are for a break; but when top prices are reached, operators will be treated to a big decline, ranging from 50 to 75 per cent, so that the person who sells at an advance will make the money.

From the outside mining districts our advices continue uniformly good. It looks as if the managers of

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		ASSESSMENTS.		SECRETARY.	
Andes M Co, Nevada.	33	March 8, April 11, April 23.	J W Twigg, 309 Montgomery		
Best & Belcher M Co, Nevada.	51	March 8, April 11, April 23.	L Osborn, 313 Montgomery		
Belcher M Co, Nevada.	43	March 8, April 11, May 3.	C L Perkins, 331 Pine		
Bullion M Co, Nevada.	37	March 10, April 21, May 11.	R B Grayson, 331 Pine		
Butte Queen M Co, California.	2	Jan 26, Feb 27, Mar 28.	V Gadesen, 119 Bush		
Cal Verde Antiquo Marble Co, California.	2	Feb 2, Mar 7, Mar 28.	W J Gunnert, 318 Pine		
Central New York M Co, Nevada.	51	March 10, April 12, May 5.	C E Elliott, 309 Montgomery		
Crown Hill M Co, Nevada.	7	March 13, April 19, May 10.	J Newlands, 331 Pine		
Full River Con G M Co, California.	7	Feb 24, April 2, April 25.	L Cassel, 115 Front		
Golden Pledge Gravel M Co, California.	16	Feb 30, Mar 24, May 7.	W J Gleason, Phelan Block		
Golden Prize Con M Co, Nevada.	5	March 23, April 2, April 23.	C D Bennett		
Gusacuan and California M Co, B. C.	5	Feb 9, Mar 13, Apr 5.	F Oliver, 22 Mint Ave		
Head Centre and Tranquility Co, Arizona.	4	March 14, April 19, May 12.	J W Pew, 310 Pine		
Kentuck Cons M Co.	3	March 22, April 26, May 19.	J W Pew, 310 Pine		
Keystone Cons M Co, California.	2	March 9, April 19, May 9.	J H Isham, 310 Pine		
North Belle Isle M Co, Nevada.	15	March 1, April 5, May 3.	J W Pew, 310 Pine		
Original Keyhole M Co, Nevada.	9	March 4, April 14, May 7.	F E Lutz, 331 Pine		
Overman M Co, Nevada.	63	Feb 10, Mar 15, Apr 8.	G D Edwards, 414 California		
Peer M Co, Arizona.	12	Feb 21, March 26, April 28.	A Waterman, 303 Montgomery		
Pine Hill M Co.	1	Feb 11, March 24, April 15.	Ohas A Hare Steuart St		
Sage M Co, Nevada.	75	Feb 2, March 26, April 15.	E B Holmes, 303 Montgomery		
Solid on Con Quicksilver Co, California.	1	March 15, April 26, May 18.	E F Stone, 346 Pine		
Union Con M Co, Nevada.	14	March 8, April 11, April 23.	A H Fish, 303 Montgomery		
Weldon M Co, Arizona.	5	Feb 9, Mar 15, Apr 14.	A Waterman, 303 Montgomery		
Yellow Jacket M Co, Nevada.	50	Feb 2, Mar 4, Apr 2.	W H Blauvelt, Gold Hill		

LATEST DIVIDENDS.

COMPANY AND LOCATION.		AMOUNT.		SECRETARY AND OFFICE IN S. F.		PAYABLE.	
Cons Cal & Virginia M Co, Nevada.	50	March 15, 309 Montgomery				Aug 17	
Eureka Cons M Co, Nevada.	25	H P Bush, 101 Sansome				Jan 5	
Great Western Quicksilver M Co.	25	Holes, 328 Montgomery				Oct 1	
Pack Con M Co, California.	1	H Glou, 230 Montgomery				Feb 10	
Standard Cons M Co, California.	10	J W Pew, 310 Pine				Mar 26	

the mines in two of the districts are preparing to do something so as to sell out their stocks at higher prices, provided gudgeons will bite at the bait that will be thrown out.

From the Comstock mines our advices continue favorable. While the mines are in better condition than ever before for economic working and the paying of dividends, the inside rings are all wrong in every way and diverting the turning of bullion and part of the assessment money into their already overhanging exchequer. In Con. Virginia, developing work gains in importance. Official letters from Mexican are silent on a recent ore find, as are the Ophir letters on the find made some months ago. If Savage, Gould & Curry and Best & Belcher were differently managed, the rich ore in them would be shown up and distributed. The turning of bullion could be found so that the bullion would not be confiscated by inside rings. The ore strike reported by us in the Ward shaft is now officially announced. It is more important than insiders like the public to believe. Another strike was made in the shaft, but it is as yet a sealed book to outsiders. They are evidently preparing to show up, in one or more of the Gold Hill mines, the ore to the east which the late Senator Sharon was unable to take out, owing to water interference.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING March 2.	WEEK ENDING March 9.	WEEK ENDING March 15.	WEEK ENDING March 22.
Alphas.	.30	.35	.30	.35
Alta.	.30	1.00	.90	.30
Andes.	.55	.65	.35	.40
Belcher.	1.20	1.00	1.20	.95
Belle Isle.	.25	.25	.20	.25
Best & Belcher.	2.45	2.35	2.30	2.00
Bullion.	.70	.80	.55	.60
Bodie Con.	.50	.50	.45	.50
Bulwer.	.40	.45	.40	.45
Commonwealth.	.15	.20		.15
Con. Va. & Cal.	4.05	4.50	4.15	5.37
Challenge.	.80	.95	.90	.85
Chollar.	1.10	1.25	1.35	1.50
Confidence.	2.10	2.50	2.40	2.25
Con. Imperial.	.05	.10	.05	.10
Calestonia.	9	1.05	.75	.90
Crown Point.	9	2.05	1.15	.70
Crocker.	.05	.05	.05	.05
Del Monte.	.40	.45	.35	.30
Eureka Con.	1.65	1.85	2.00	
Exchange.	.35	.40	.35	.45
Grand Prize.	.65	.65	.65	.65
Gould & Curry.	1.25	1.40	1.30	1.50
Hale & Norcross.	1.40	1.75	1.20	1.50
Julia.	.10	.10	.10	.10
Justice.	.10	.10	.10	.10
Kentuck.	.15	.10	.15	.15
Lady Wash.	.20	.25	.20	.20
Mono.	.31	.35	.75	.80
Mexican.	1.60	1.80	2.05	2.05
Nevado.	.10	.10	.10	.10
North Belle Isle.	.10	.15	.10	.15
Nev. Queen.	.25	.30	.25	.30
Occidental.	.35	.40	.30	.35
Ophir.	2.55	2.80	3.00	3.00
Overman.	.60	.65	.60	.65
Potosi.	1.10	1.25	1.25	1.15
Peerless.	.05	.05	.05	.05
Peer.	.05	.05	.05	.05
Savage.	1.0	1.15	1.65	1.55
S. B. & M.	.35	.60	.45	.35
Sierra Nevada.	1.25	1.35	1.75	1.60
Silver Hill.	.10	.10	.10	.10
Scorpion.	.15			
Union Con.	1.35	1.45	1.40	1.65
Utah.	.30	.25	.25	.25
Yellow Jacket.	.65	.75	1.20	1.20

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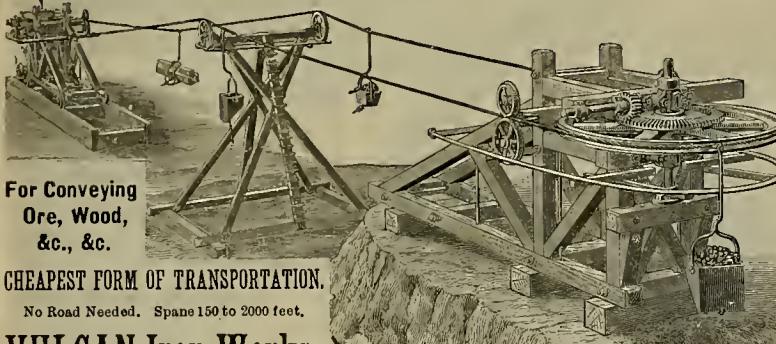
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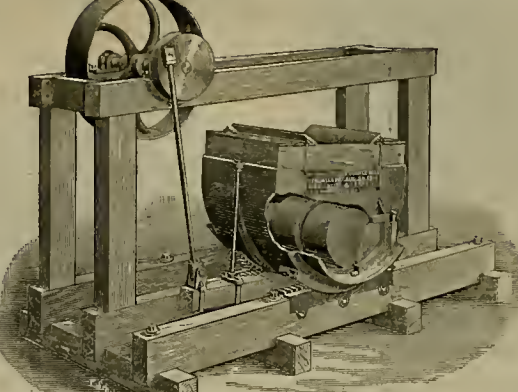
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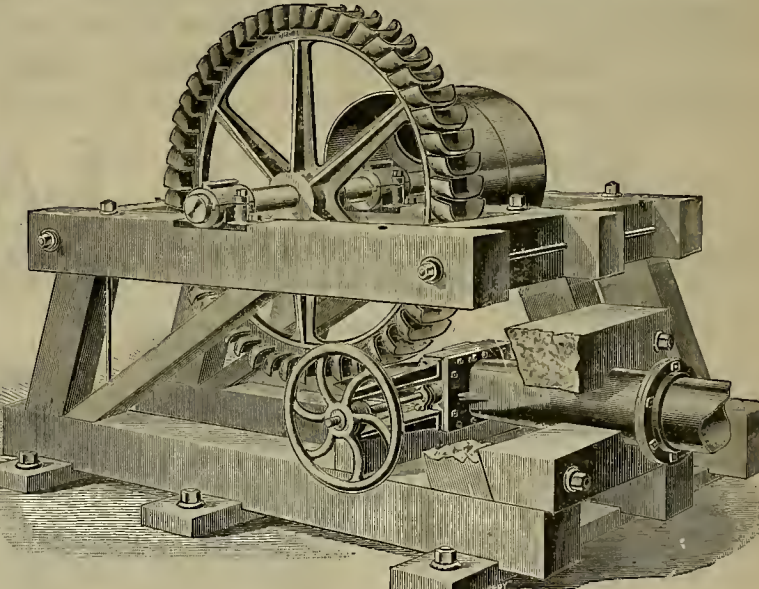


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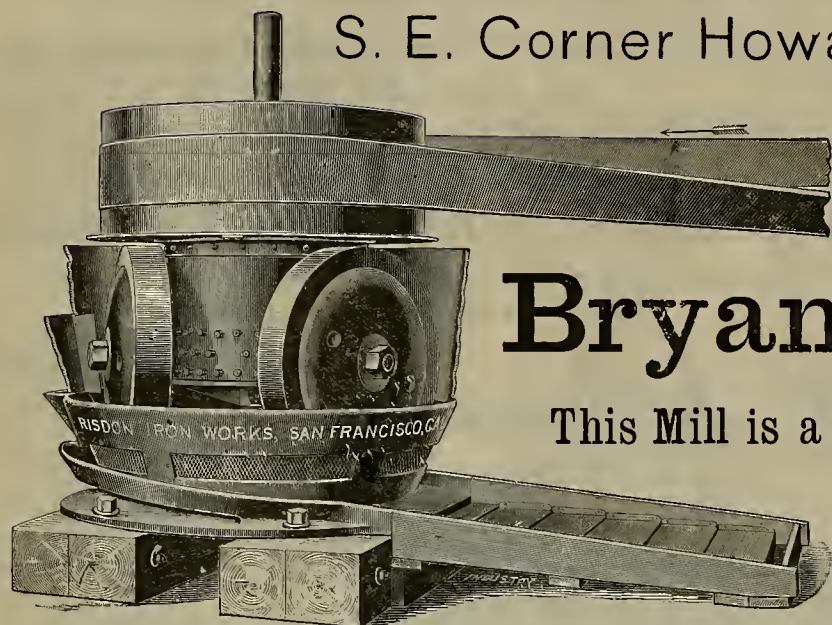
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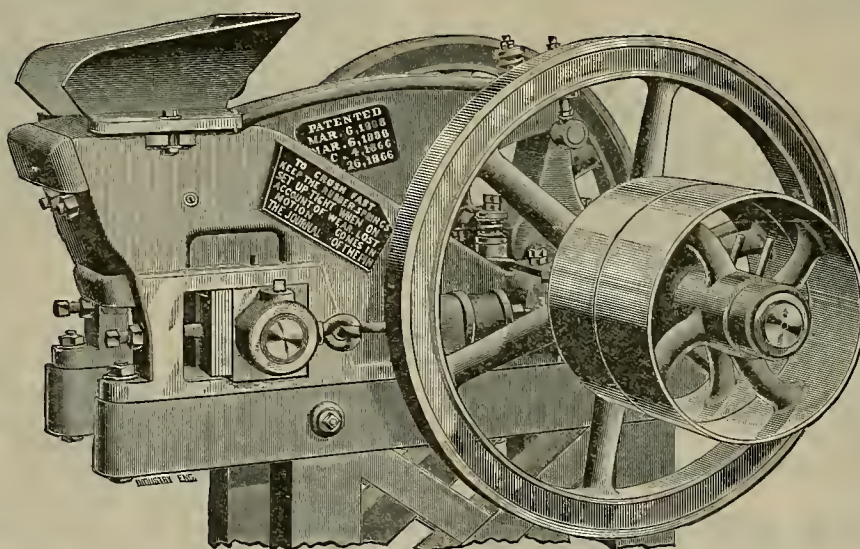
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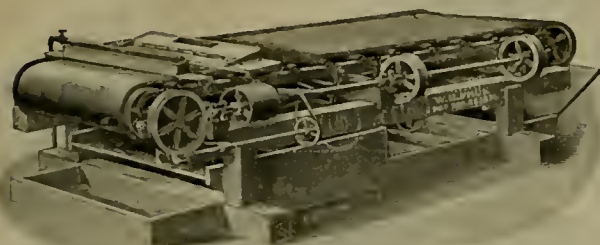
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 MESSRS. ADAMS & CARTER, San Francisco, Cal.—Dear Sirs: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the Frue in first place. When I built this mill (20 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for TWELVE MONTHS. They are taking the pulp from 20 st mps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and haul it at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same beatings and wearing parts, require no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from \$5 to \$20 per ton and the tailings from 100 lbs to 60 cts. per ton. I will conclude by saying that I cannot endorse the six foot Frue Vanner too highly, and it is the only table that I would have in my mill.
 C. J. CLARK, Gen'l Supt.

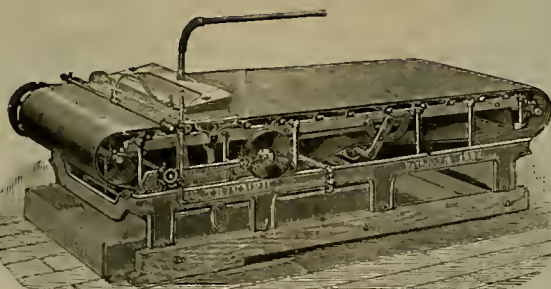
Price of 4-foot wide Main Belt Frue Vanner..... \$350, f. o. b.
 " " " Improved Belt Frue Vanner..... 800, f. o. b.
 " 6-foot " Plain Belt Frue Vanner..... 800, f. o. b.

For any information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO.,
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"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.



(PATENTED.)
 Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

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 Principal Office, 401 California St., cor. Sansone, S. F.
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 Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

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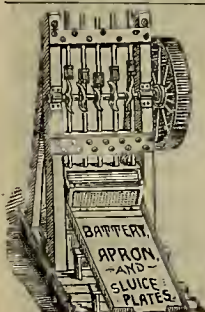
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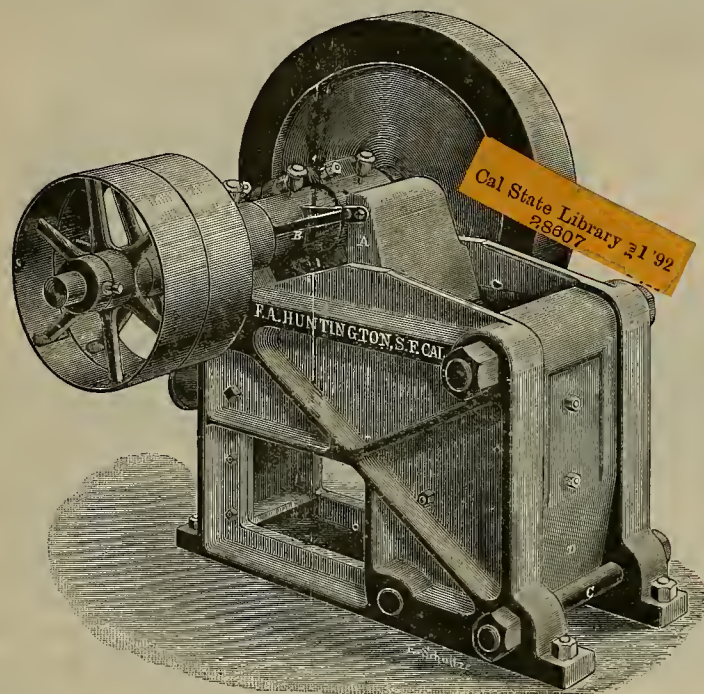


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 and Nickel Plating.

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— MANUFACTURER AND DEALER IN —

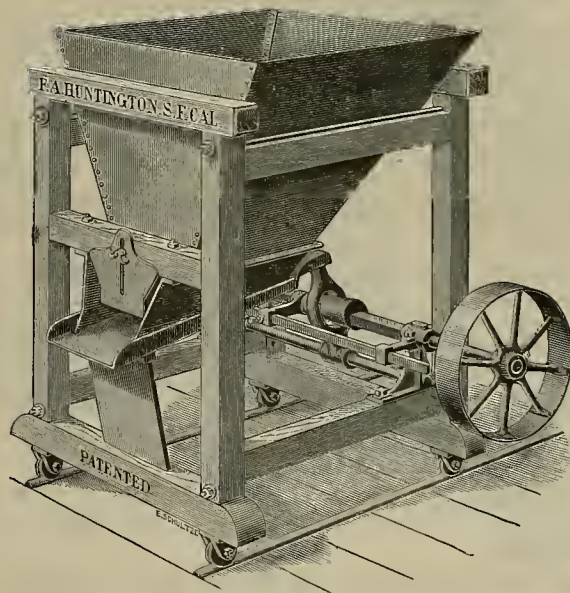
MINING MACHINERY.



HUNTINGTON'S IMPROVED ROCK-BREAKER.

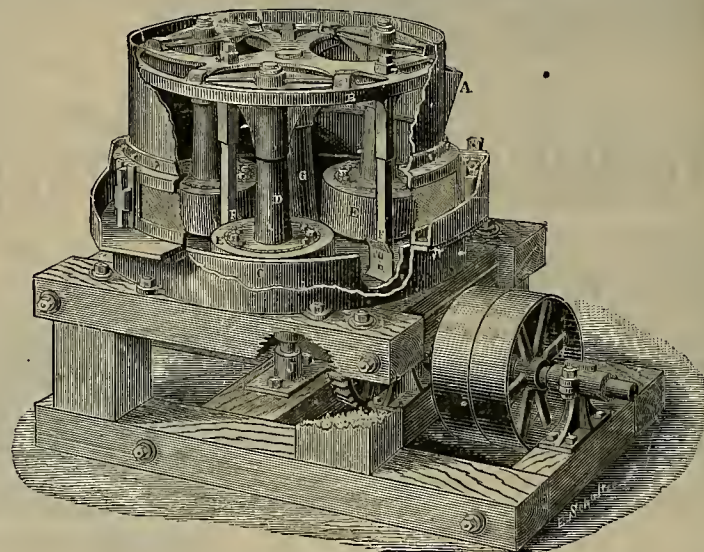
The Main Features of this Machine are Strength, Ease of Adjustment, and Simplicity of Construction.

The movable jaw A is worked by the eccentric B and is pivoted at the bottom. The stationary jaw D is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt C. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt C and the jaw D. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



HUNTINGTON'S PATENT ORE FEEDER. PATENT SHINGLE MACHINE.

This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.

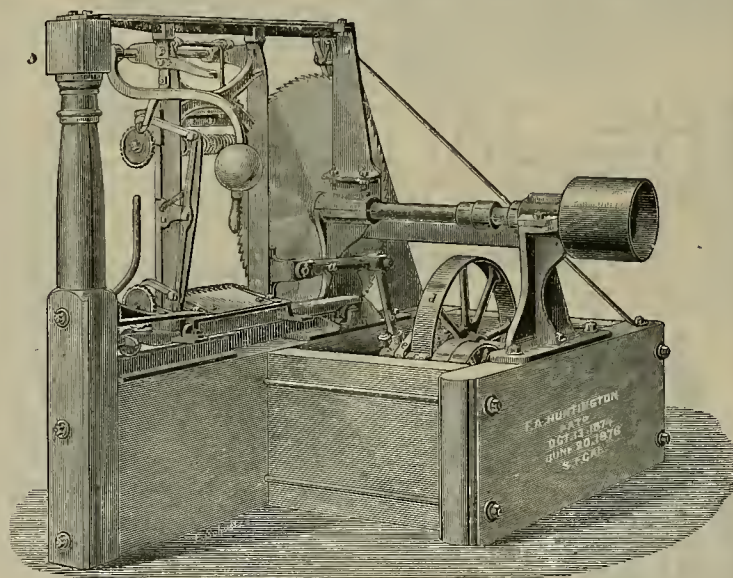
The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slime, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet-crushing and gold-saving it has no equal.

I CLAIM ESPECIAL MERIT IN THAT FEATURE OF THIS SYSTEM WHICH PREVENTS ALL FLOURING OF GOLD AND QUICKSILVER, and the consequent loss of gold that attends stamp-milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.



This machine is so well and favorably known by all the principal lumbermen on the Pacific Coast that it is useless to go into any detailed account of its merits; suffice it to say that recent improvements in a new, quick return feed-works has placed it far ahead of all competitors. Send for Circulars.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV. — Number 14.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, APRIL 2, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Measurement of Ropes.

Circumference vs. Diameter.

For the following measurement of ropes we are indebted to Mr. A. S. Hallidie, President of the California Wire Works of this city:

A custom has obtained of measuring ropes by their diameters, and the consequence has been that many disputes have arisen between the seller and buyer, regarding the actual size of such ropes.

The custom that has generally prevailed heretofore has been to measure ropes by their circumference, and this custom is still in use where ordinary technical or business accuracy is required, and no other way of measuring a rope can be relied on for accuracy and fairness. This applies equally to all kinds of ropes, whether three, four or six stranded.

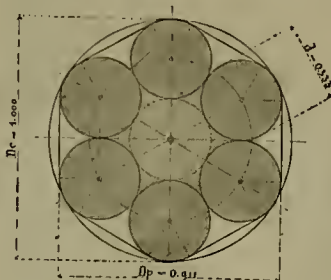
Take for example a rope made of six strands; its section is as shown in the annexed diagram, and there being no accepted rule as to where the diameter shall be measured, it may be taken at any part of the circumference of the hexagon formed by the six strands.

Now what constitutes a one-inch rope when measured by diameter? Is it one inch measured on a line cutting the axis of two opposite strands, or is it measured on a line cutting midway on the faces of the hexagon, or is it any point between? There can be no dispute as to this method of measurement, applied to a round bar of iron; but modify the circle to suit the conditions of a six-strand rope (nearly all wire ropes are thus made), and the trouble begins. The measurement on line "Dc" is one inch, but on line "Dp" it is only 0.911 inches; hence there is a cause for dispute that would not exist if the circumference was taken as the measure, instead of the diameter.

But even in measuring the circumference of a rope there is a possibility of unfairness, in the absence of a defined method of measurement, although this possibility is much reduced. Such ship chandlers and hardware men as are required to sell rope by circumference are very apt to take a piece of rope yarn and wrap it around the rope, and cut across the overlapping parts; but a mining or cable railway superintendent requires a more accurate way of measuring, and will take a piece of twine.

Better than either is a piece of ordinary writing-paper about one-quarter inch wide, which is wrapped around the rope and cut off at the overlap with a sharp knife. This will give the circumference measured on the faces of the hexagon, and determine exactly the size of the rope.

A careful consideration of the question will show this advantage in measuring rope this way; each division of space of the circumference is three times that of the diameter.



MEASUREMENT OF ROPES.

ter, hence the circumference is three times as accurate, and in every way, both as to fairness, accuracy and simplicity, is to

The Mining Building at Chicago.

The Mines and Mining Building for the World's Fair at Chicago is now well advanced in construction. The style of the building, as the engraving shows, is classic, and its dimensions are 700 by 350 feet, with a height of the main cornice 65 feet. There is a pavilion at each of the four corners 85 feet square and 90 feet in height, surmounted by a dome. Entrances to the building are on either side, besides the grand entrances at each end, which latter are 110 feet high and 82 feet wide, opening into vestibules. A 60 foot balcony extends entirely around the building, and the roof of glass is 100 feet from the floor. The total cost of the structure is estimated at \$350,000. S. S. Beman, of Chicago, is the architect.

In this building are to be grouped all those objects connected with the mining

To Visit the Mines.

All sorts of associations and organizations have made excursions to California in the past ten years, and have been entertained by our citizens. They have been shown the usual stock sights of the metropolis and the country, taken through the citrus fruit belt, the wine and raisin regions, looked at our manufacturing plants, universities, stock farms, the natural scenery, and all that sort of thing. But none of these visitors have been told anything about the mines of the State, and have never been taken to the mining regions.

For the first time, now, an Eastern excursion party is to be taken up country and shown the mines at work. The delegates to the National Educational Convention (which is to meet here in May) are to be shown the industrial features of the State. They are to be shown the centers of citrus and deciduous fruit interests, raisin and wine making, etc., and are to be taken to the mines. The system of hydraulic mining will be exhibited at Dutch Flat, Placer county, and probably the quartz mining at Grass Valley, Nevada county.

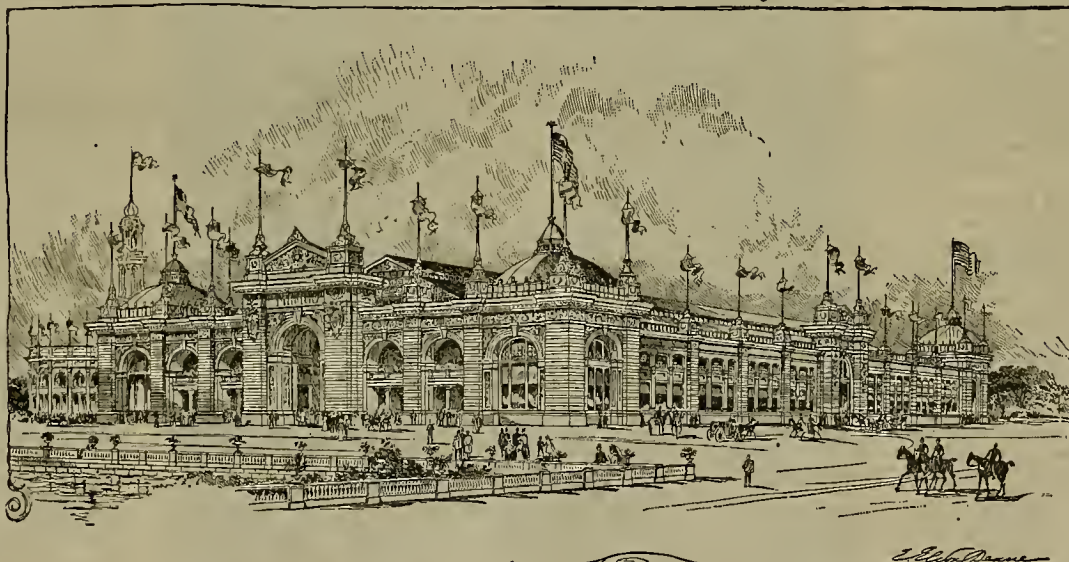
These are real newspaper men who are coming on this excursion; men who will write of what they see. They are not coming on a junketing expedition, but to examine into the resources of the State. It is well, therefore, that the mining industry is for once recognized. The California Miners' Association was requested to appoint a committee of reception to cooperate with the other

societies, and the following were appointed: S. K. Thornton, W. C. Ralston, Henry Martin, Chas. G. Yale (of the MINING AND SCIENTIFIC PRESS), and W. H. Meade. At a meeting held this week, a program was laid out. As to the mining features, the principal one will be the visit to the old Dutch Flat mines. There the process of hydraulic mining will be shown, as one of the claims will be run an hour or two for that purpose. The sluices will be cleaned up, and the whole process illustrated. The visitors will be given a miner's meal of beans, bacon, flapjacks, brown bread and coffee.

It is one of the hopeful signs of the revival of interest in mining in this State, when a large party like this is invited to see actual gold mining carried on.

The total bullion product of the Hale & Norcross mine for the month of February was \$28,083.08, and the average battery assay of all ore worked was \$21.82 per ton.

The Harqua Hala gold mines, Arizona, are reported sold to a New York syndicate,



MINES AND MINING BUILDING AT THE COLUMBIAN EXPOSITION.

be preferred. The diagram shown herewith will graphically explain my contention.

d = diameter of strand
Dc = " " circle
Dp = " " between hexagon sides
C = circular circumference
Cp = hexagonal circumference
Dc = 3 d = 1.000
Dp = 2.732 d = 0.911
d = Dc = 0.333
Cp = 9.14 d = 3.046
C = 3.14 = 3.1416
C = 1.031 Cp
Cp = 0.97 C

ALAMEDA COUNTY MINERS' ASSOCIATION.—An association of mining men in Alameda county was formed in Oakland last week. The officers are as follows: F. Chappellet, president; W. P. Perrine, first vice-president; J. W. Henderson, second vice-president; C. B. Rutherford, secretary.

AMADOR COUNTY MINERS.—A branch Miners' Association has been formed in Amador county, with the following officers: J. F. Parks, president; W. Truscott, J. Tregloan, J. Venning and J. Hoskins, vice-presidents; A. B. Call, secretary.

industry. Coal and iron, gold and silver, and all other forms of mining in this country, will be illustrated there. In the display of minerals, California will make the best show of any State if the collections belonging to the State are forwarded as intended. In mining machinery, however, thus far there has been no special preparation, and it is not probable that anything very extensive in that line will go from here.

THE Black Wonder is another Colorado mine now being hoisted. Senator Jones is reported as saying it is a second Comstock, because the assays run \$17,000 a ton. We do not believe Senator Jones ever said anything of the kind, because high assays of that kind amount to nothing whatever and any mining man knows it. It is hush and nonsense to suppose any amount of such ore has been found. That sort of an assay as a basis of values, would not have the slightest influence with an experienced miner.

THE MacArthur Forrest process is to be tried in Arizona shortly.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ed.

Mines of Grass Valley.

GRASS VALLEY, CAL., March 25, 1892.

TO THE EDITOR:—In my last letter, written in this city, I promised additional information concerning the mines of this locality. Within the past few days things have been unusually lively about the Peabody mine, which is located just on the edge of the town. The old hoisting plant had become too small to satisfactorily perform the work and new machinery is now replacing the old. The work is being quickly accomplished, too, and before this letter is in print I have no doubt the new engine and hoist will be in operation. The Peabody mine is the property of the Nevada County Development and Improvement Co., with Alfred Tregidgo as superintendent.

The main working shaft is now down over 430 feet and sinking is in progress. The rich strike referred to in my former letter was made in the lowest part of the mine, and since that time more rich rock has been taken out. The new machinery will be powerful enough, it is thought, to sink to 2000 feet at least. The shaft has three compartments and is 13 by 8 feet. This mine has had a constant battle with water and is now raising a large amount. A Knowles, a Davidson and a Blake pump, each No. 7, are now employed in raising this water, but these will soon be replaced by a 12-inch plunger which will control the water for some time at least. The water is now raised from the bottom of the mine to the 250-foot level by the steam pumps referred to. On this level, it flows in a flume to the old pump shaft, where a 10-inch Cornish pump hoists it to the surface, a Pelton wheel furnishing the power. Rock from this mine has been milled for some time past in the Rodgers mill, a few hundred yards distant, but the company will probably build a new mill later.

Mr. Tregidgo has a proposition on foot which promises much for the mines and manufacturing establishments of Grass Valley and vicinity. The gentleman proposes to locate an immense electric plant on the Yuba river some miles distant, and from there distribute power and light to all points where it is required within a radius of many miles. The plan is entirely feasible, the only question being the securing of sufficient contracts to render his scheme a financial success.

At the Idaho mine, everything appeared to be running smoothly—in fact, the business of mining has been carried on for years at this great bonanza without anything of particular moment to disturb the even tenor of its way. The only thing worthy of mention, perhaps, is the fact that what appeared to be a new shoot of rich rock had been discovered on the 1900 level. Free gold was visible in much of the rock, a bluish quartz with foils of serpentinized material.

Melville Attwood, the veteran scientist and mining engineer, has been in Grass Valley for several days past and has made frequent visits to the Idaho.

Among the great mines of this locality is the Omaha Consolidated, Geo. Mainhart superintendent. The Omaha is sinking two working shafts, both being equipped with hoists of recent pattern. The shafts are each 1000 feet deep, levels being opened every hundred feet from top to bottom. The quartz is crushed in a mill of 28 stamps, which is under the same roof with the main hoist. In this mill are two batteries of five stamps each, and two of four each. About 50 tons of rock are crushed daily and the mine is on a paying basis. One hundred men are employed and the entire property appears to be under excellent management and one of the best examples of a well equipped, well managed mine in the district.

Near the Omaha is the Menlo, which is opened to the 300-foot level, a small force of men is engaged in development and good rock was being raised at the time of my visit. The property is being managed by Wm. D. Smith, and is among the promising mines about Grass Valley. The Homeward Bound, owned by the same company, is now idle, but operations will be resumed soon.

At the North Star mine, which, by the way, is one of the largest concerns here, everything is going on as usual. It has the most perfect equipment that I have yet seen. The great pump which raises the vast volume of water from this mine was formerly in the Chollar mine on the Comstock and is capable of doing much heavier duty than it is now called upon to perform. The mill is a model of convenience, every

piece of machinery and all the shafting being easily accessible and in the light.

The Brunswick, situated on the Idaho fissure, is evidently a coming property. It also occurs at the contact of diabase and serpentine rocks. Some splendid looking quartz was being taken out by tributaries at the time of my visit. The shaft is down 565 feet, and will be carried down to 600 feet, where a new level will be opened. The mine is supplied with good hoisting machinery and pumps. A four inch bucket pump lifts the water from the bottom of the mine to the 265-foot level, from which point an eight-inch pump of similar design controls the water from below, and also the surface water, which fortunately appears to be the larger amount.

The Empire mine is among the great prosperous properties of the district. Over 100 men are employed here and everything seemed to run like clockwork. The mine is equipped with powerful hoisting machinery, pumps, etc. It has a first class mill, a complete machine shop, and every modern convenience for the complete and economical working of the mine.

A new shaft is being sunk on the Hudson Bay, near the North Star, and the miners were expecting to cut their vein at any time, when I was there. The work is under the direction of Mr. Tregidgo.

Work, which some days since was stopped on the California, has been resumed. It is looked upon as one of the most promising mines in Grass Valley district.

The Central North Star Company has just completed a new hoisting and pumping plant, and active development is now looked for in that direction.

Prospectors, singly and in pairs, are scattered over the hills looking for new veins or opening old ones. As I said last week, there is abundant opportunity for work of this character, and the prospectors should receive substantial aid from the men of means of this city, and many paying mines would result from this combination of labor and capital.

The mines of Grass Valley and vicinity are not worked out, but they need just now a little more push and energy to bring the hidden treasures to light.

W. H. STORMS.

Coast Rivers and Harbors.

The House Committee on Rivers and Harbors has completed its consideration of the regular appropriation bill, recommending in all \$20,700,000, or nearly \$4,000,000 less than last Congress. On this coast the Columbia at the Cascades gets \$435,000. Among the appropriations above \$10,000 in the bill are the following: Humboldt harbor and bay, \$200,000; Oakland, \$150,000; Wilmington, \$20,000; San Diego, \$50,000; San Luis Obispo, \$30,000; Coos Bay, \$210,000; Yaquina bay, \$75,000; Tillamook bay, \$15,000; Gray's harbor, Chehalis river, \$30,000; Olympia harbor, \$25,000.

As to rivers, the Sacramento and Feather get \$150,000; San Joaquin, \$50,000; Petaluma creek, \$10,000; the Columbia at the Cascades, \$335,000; Upper Columbia and Snake, \$15,000; mouth of the Columbia, \$300,000; Lower Willamette and Columbia below Portland, \$50,000; Willamette above Portland, \$30,000; Coquille, \$25,000; south of Siuslaw, \$10,000; Snake river to Seven Devils mining district, \$20,000; Skagit, Steilacquamish, Nooksack, Snohomish, and Snoqualmie rivers, \$10,000; Snohomish slough, \$15,000.

The appropriations for the California rivers are much less than was hoped for. The Government Debris Commission showed in its report that a much larger amount than this would be necessary to put the rivers in proper condition. However, a start can at least be made with the amount suggested. The River and Harbor Convention people will be disappointed at the smallness of the appropriation suggested by the Committee.

HOME MANUFACTURED SCIENTIFIC INSTRUMENTS.—The A. Lietz Co., makers of scientific instruments, has recently been organized in this city, and the business of a private firm will now be enlarged and extended by the incorporation. The directors are Adolph Lietz, C. Weinmann, Otto Von Geldern, E. T. Schild and C. E. Grunsky. These gentlemen do not give up their engineering practice by becoming directors of the company, but their experience will assure the production of instruments of precision with every improvement. Some of these directors are practical field engineers, well known to the profession on the Pacific Coast. The new company will keep on hand an assortment of field and office supplies for civil, mining, irrigation, hydraulic, military and mechanical engineers. The Lietz surveying instruments manufactured are well and favorably known, especially de-

signed in details for the requirements of this coast. Mr. Lietz, the President of the company, is examiner and adjuster of instruments for the U. S. Surveyor-General, Wm. H. Pratt. In addition to the manufacture of special work, the company is in a position to manufacture and repair scientific instruments of any character for astronomical, philosophical, nautical and similar purposes.

Practical Matte-Smelting, No. 2.

MINERAL, IDAHO, March 25, 1892.

TO THE EDITOR:—On reflection, I find that my communication on "Practical Matte-Smelting," published in these columns on January 20th last, contained no allusion to what must be regarded as one of the most important and most obvious characteristics of this group of processes.

The unconscious omission has been made clear to me by the receipt of letters of inquiry, for the most part from the owners of mines who desire to inform themselves concerning this mode of ore treatment, and to whom my statements, while evidently striking, were not as conclusive as I could wish they had been. The omission to which I refer is this: While I said as emphatically as possible that matte-smelting under all circumstances would extract the gold, silver, copper, nickel and cobalt, and a portion of the lead, I neglected to state that it would extract them all at once, or rather all in one operation. The consequence is that we would not ordinarily have to make any differences in our smelting work, whatever be the metal that we desire to save. The variations in practice come from the nature of the accompanying substances (the gangue) that we desire to get rid of. No doubt every metallurgist who reads this will say that these reflections are unnecessary—that they are too obviously the resultants of what I wrote before, and I should have taken this view myself, except for the receipt of certain queries whose tenor was such as to convince me that, to the lay reader, these principles were not by any means too clearly understood, even by men who, like several of these correspondents, are very evidently possessed of great acumen and business sense. Such people are not, as a rule, concerned in an inquiry into the metallurgical principles of this or any other process. Their investigations tend to the all-important end of, "How much money can be made out of it?" This is a very proper inquiry, strictly in line with true progress, and entirely consonant with the celebrated definition of metallurgy as "the art of making money out of ore."

To render these inquiries a little less haphazard, I have prepared a list of questions, presented herewith, which embrace, I believe, all the essential requirements of matte-smelting. They embrace, in fact, more than that, for I do not see why an inquiry into the possible adaptability of a process should not include the comparative adaptability of every other known process, whereby the particular question as to the usefulness of a certain method becomes merged into the general question of what process, under given conditions, best satisfies those conditions. The question becomes, under the most favorable circumstances, not unlike a mathematical problem, where we deal in known and unknown quantities, and finally arrive at the answer through the solution of an equation. We might, I fancy, even solve the metallurgical problem in a similar summary way were it not for the too great preponderance of unknown quantities, which act quite as prejudicially in metallurgical as in mathematical analysis, though doubtless we can, by dint of investigation, place our theorizing upon a plane of equal exactness and certainty.

ACCURATE INFORMATION NECESSARY.

To properly decide upon the best mode of treatment, two conditions must be complied with. We must be in possession of copious and accurate information; and second, we must enter upon the consideration in the right spirit. That is to say, we must have no particular process to advocate. The engineer who has such a hobby sinks the metallurgist in the "process man" and loses his power of being useful to his clients and to his profession. It is a regrettable fact that more than one of our foremost authorities, acting in obedience to the natural but injurious tendency that leads the successful cultivator of a particular process to advocate it in season and out of season, have thus degenerated, losing the philosophic engineer in the huckster of patent rights!

Besides the possession of the unbiased spirit, there are certain facts with which it is necessary to familiarize one's self in order to efficiently perform that oftentimes vague duty of "reporting upon a mine" or deciding upon a process. In proportion to the thoroughness with which we get up these

facts, and familiarize ourselves with the surrounding conditions, will our reports become valuable. Mining reports are most frequently written to decide categorically some question of economic geology or of ore treatment, and demand for the most part no inconsiderable local knowledge in addition to the technical information which is the stock in trade of modern engineers.

THE QUESTIONS ASKED.

The queries which I am in the habit of propounding when I seek to solve the special problems of ore treatment are as follows:

THE ORE.—(a) How many measured tons are in sight? (No guesswork allowed nor any estimate of possibilities. Ore below the lowest workings has no place in this estimate.) (b) Give average contents of the whole mass (not picked specimens or small lots) in gold, silver, copper, lead and other valuable metals, each separately. (c) Give as closely as possible the percentages of the whole mass in quartz, oxide of iron, iron pyrites, zinc blende and every other constituent most carefully and thoroughly. Estimations by the experienced eye are often sufficient as to the composition of undecomposed gangue matter, but must usually be supplemented by a chemical analysis in the case of decomposed ores. Thus, an ore containing such unmistakable constituents as quartz, calc spar and pyrites would require no analyses to assist in deciding upon a process, for the mere ocular inspection of such is sufficient. THE PROPORTION of each of the constituents is very important, of course, and should be made the subject of particular inquiry. To make assurance doubly sure, one analysis or, better, several analyses of average ore samples are advisable. (d) What part of the gold is free to amalgamate? (e) What mineral is the remaining gold contained in? (f) What proportion of the silver is extractable by amalgamation of the raw ore? (g) What mineral holds the remaining silver? (h) In what form are the remaining valuable metals? (i) Give proportions of lead, copper, etc., as sulphides, oxides, etc.

COST OF PRODUCTION OF THE ORE.—Give estimates, based on costs of labor, materials, cost of necessary mining plant and roads, of producing one ton of ore and doing necessary dead work. This must include all interest charges, depreciation of plant, administration expenses, etc. Add to above the estimated cost of hauling one ton to the proposed place of reduction. (If a portion of the vein matter, easily separable from the remainder, is of different character, can be mined by itself, and is supposed to be amenable to more advantageous treatment than the bulk, describe it precisely as above.)

THE FUELS.—Wood—Give kinds and cost per cord of each sort, in large quantities, delivered at place of reduction. Charcoal—Give kind and cost per ton per cubic foot or per bushel of about 2600 cubic inches. Delivered in large quantities. Is the future supply certain? Coal and Coke—Give kinds, with prices delivered, per ton of 2000 pounds, large quantities. If the coal is a local variety, give analyses.

THE FLUXES.—Describe with detail the available sources of iron ore and limestone, giving analyses of each. Give cost per ton of each delivered in large quantities. The estimates of people engaged in quarrying and transporting such material are preferred. In all these cases, it is imperatively necessary to avoid guessing at costs. Thorough investigation is essential.

FLUXING ORES.—Whenever it seems probable that ores of a fluxing character can be had instead of the usual fluxes, iron and limestone, such deposits must be studied exactly as indicated above under the head "The Ore." The same is true to some extent of the iron ore and limestone deposits, which must be thoroughly studied, especially as to their purity and accessibility.

TRANSPORTATION.—How long is the wagon haul (or pack-train route), and for what price can sacked material or general freight be contracted in large quantities to the nearest railway or steamboat shipping-point? If such data are procurable, give the railway charges thence to some metallurgical center, as Denver, on carload lots of copper bars and matte, lead bullion, sulphide concentrations, crude ore, etc. The ordinary railway freight classifications and tariff afford little information on this subject, inasmuch as the companies invariably grant much lower rates—"special rates" as they are called.

WATER POWER.—Give quantity of unappropriated water in miners' inches, with fall and distance from proposed site. Of appropriated water, mention cost per 24-hour inch and power available. Discuss in this manner all possibly available sources of water power.

WATER FOR OTHER PURPOSES.—(Supply for battery, boiler, pans, etc.) Give avail-

able quantity in miners' inches, cost of bringing it to proposed site, and furnish analysis, or at least some data as to its chemical and physical properties, such as its effect in forming boiler incrustations. Give its temperature.

LABOR.—Character of labor supply. Nativity of the miners and laborers. Wages of miners. Ditto of surface laborers, furnacemen, amalgamators, mill hands and all existing classes. Does a labor union exist?

PRESENT FACILITIES FOR REDUCTION. Describe existing mills, furnaces, etc., their condition and adaptability to the work. Discuss the results of past working, percentage of recovery, cost of treatment, etc.

Give full information regarding accidental occurrences or uncommon facilities, such as exceptionally cheap native salt, carbonate of soda or other factor of reduction; also enlarge fully upon the possibility of securing other ores, fluxing or otherwise, describing each source as accurately as possible, in the manner prescribed for ores.

Include a statement of the financial expectations of the investors. Is there capital sufficient for the construction at once of a complete plant, or is it expected that a part only will be erected immediately and subsequently enlarged out of the profits of working?

A PROCESS SUITED TO THE CONDITIONS.

Once in possession of the above data, the requirement is not to fit some particular process into the conditions, but to find that process which is best favored by the conditions. It is not well to be too exacting; it is useless to expect a perfect fit. The desire should be to satisfy the most important conditions—the inexorable ones. As I hope to show elsewhere, some of the greatest metallurgical successes ever made were made in spite of strongly adverse conditions, which, however, were overbalanced by some single favorable circumstance of relatively great importance, a case in point being the ores of the Comstock lode.

It will be remembered by those who have made themselves familiar with my previous contribution that I offered to receive samples of typical ores, and advise upon their adaptability to this matting. Quite a number of such suites of specimens has come to hand, but as I anticipated, accompanied, as a rule, by such a paucity of information that the advice I could tender was in most cases of so tentative a nature that I fear it could hardly be deemed satisfactory or conclusive. Feeling the obvious need of each case, I therefore recommend to those who meditate an application of this sort, to myself or to any other engineer, a strict and thorough preliminary study of the situation upon the lines herein laid down—a careful working up of the questions, and then, and not till then, a reference of the whole case to the engineer. Any intelligent mine owner ought to be able to collate these facts, and I do not see why the engineer or metallurgist, with all this information before him, should not be able to form as reliable a judgment as to the working process to be ployed as he could possibly do if he were to make a personal visit to the spot—more so, in many cases, for it is one of the chief evils of the business of mining expediting that its conclusions are not often derived from sound premises, but are quite commonly the whimsical deliverances of some one who is popularly supposed to have "a tiptop judgment on a mine."

But it is useless and thankless to inveigh against the mining expert—that long-established and sometimes useful nuisance—whose very existence and appearance go far to prove the contention that "mining doesn't pay." Let us rather ask him what he would do in the following cases:

In illustration of the foregoing, I propose to introduce to the attention of the reader what I will call

FIELD STUDIES IN METALLURGY.

Under this head, I propose to cite such examples of the metallurgical and business questions which are commonly placed before engineers as will serve to illustrate some of the conditions under which the mining industry is found to lie, and which I have sought to include, tacitly, in the preceding list.

CASE I.

C, living in Central Nevada, possesses a group of veins, which, as I judge from specimens, carry oxidized silicious copper-silver ores, with and without lead; un-silicious copper-silver ore and undecomposed nonsilicious sulphides in intimate admixture of lead, copper (as copper pyrites), and zinc, carrying silver. Silver value averages perhaps 15 ozs., copper contents perhaps 10 per cent, and lead a considerable, but fortunately not too large a percentage. Of zinc there appears to be enough to be troublesome, but not enough to require special measures for its riddance. The

locality is not adapted for intricate or complicated processes, and, naturally, a single process is required which will treat all the classes of ore at one operation; and, as the claims are said to be equal to a production of 100 tons daily, a good reducing capacity is demanded. The ore contains probably nearly \$40 per ton market value in metals, and the silver is indifferently disseminated throughout, which fact, added to that of the oxidized condition of a part of the ore, precludes concentration by water as a general process. It has indeed been proposed to treat the sulphides by concentration in order to separate the galena from the accompanying copper pyrites and blende; but this is evidently faulty as sacrificing valuable copper and silver, and obtaining a comparatively poor product of galena by a wasteful, if cheap and rapid, process, which has, after all, to be eventually smelted. It would be much better to smelt the mixed sulphides and separate the products subse-

quently. If we review the various leading extraction processes, such as lixiviation in its various forms, amalgamation, etc., we do not, for obvious reasons, find them at all applicable to this case. We are facing one of those problems that have arisen of late in increasing numbers: the profitable treatment of low grade mixed sulphides. It is, in fact, a phase of the great base metal question, but it is a question that in this instance solves itself, for as nothing else can be done, C. will have to matte his ore, making a mixture of all sorts and running it down rapidly in a blast furnace (of large size on account of the zinc) and separate the resulting lead-copper, iron-silver matte into lead bullion and copper matte, while it is still molten, by the Marche's air-blast method or other cheap method, then shipping the two valuable products each to its appropriate refinery. If C. builds on this suggestion, he will realize the advantages of an inexpensive plant capable of rapid work and high extraction at low costs—the process, in fact, being to base sulphides what the stamp mill is to gold quartz and the pan to silver chlorides.

It is their simplicity that makes certain ores amenable to simple processes. It is their complexity that makes others yield readily to smelting. I believe that matte-smelting alone is applicable to the exceedingly complex ores cited. To illustrate the advantages of this complexity, I will further cite the case of M., who sends from Utah a sample of pure copper pyrites, and asks if it is suitable for matting. "Only this and nothing more!" The character of the substance—a plain sulphide of iron and copper—is such that at the first thought one is apt to answer yes; but so many qualifying conditions presently occur to the mind that the question arises: Would not some other method prove preferable in certain not unexpected contingencies? Would it be safe to recommend any process whatever in the absence of further data? Such a substance smelts easily to be sure, but it is equally docile to other processes. How about the Hunt & Douglas, the

localities in that region, particularly at the Imuris and Oso Negro mines, and at Nacozari. The general character of the ores is a mixture, more or less intimate, of galena, zinc blende, copper pyrites, iron pyrites, etc., with usually quartz or calcite. In the particular case to which I refer, it has been ingeniously proposed to roast these mixed sulphides in heaps, uncovered, and with considerable access of air, whereby two results are expected, namely, the removal of a portion of the zinc by sublimation and the decomposition of the galena by the liquation of the metallic liquation of the metallic lead, which, it is judged, will settle to and be found upon the ground at the conclusion of the operation. It is then the intention to ship this metallic lead to market as base bullion, while the remaining ore, now deprived of the lead and zinc (and sulphur?), wholly or in part, will be smelted into a matte in mixture with other silver-bearing ores in reverberatory furnaces.

In discussing this plan, it is necessary to remember that it is possible to reduce metallic lead in this way, for it is a matter of history that the lead mines of Illinois and Missouri, which produced a very pure galena, were first worked by the pioneers of that region, who, seeking lead for the purpose of making bullets, were accustomed to build piles of logs upon which the lumps of ore were placed, and, fire being applied, metallic lead soon ran out. But the process is very imperfect, and under no circumstances would the extraction of bullion by such means reach a tolerable percentage. There are no means of predicting before the actual trial what the proportion of lead extracted would be, but I should fear that the amount left in the ore would debar the use of the reverberatory for the subsequent fusing, for reasons well known to smelters who have used that style of furnace.

Again, we could not expect to derive much benefit from the influence of the heap-roasting on the zinc blende, for that substance would not probably be volatilized to any extent; but, as happens in ordinary roasting, would be decomposed into oxide and sulphate, which, being left in the ore, would prove nearly as obnoxious as the sulphide. Beyond the driving off of a portion of the sulphur, I think the operation of heap roasting would fail of good results. I would give the same advice as in the case of "C,"—that is, to fuse in cupolas to form a matte, either with the pyritic modification (Austin's process) or as in ordinary matting, according to circumstances; decompose the molten matte by an air blast, and sell the products.

HERBERT LANG.

Nevada Fall in the Yosemite.

Our artist takes us into the Yosemite and presents us a glimpse of a noted waterfall of that valley, from a point of view unlike anything before enjoyed in our columns, although we have, in past years, paid due homage to the Nevada fall.

The picture gives a profile view of the upper half of the waterfall. It well presents its volume and grace, but does not give adequate notion of its height, for the mass of water shown in the lower right hand corner of the picture has struck upon the ledge of rock, from which, it falls again in thinner sheet to the foot of the fall. In further characterization of the precipitation shown in the engraving, we shall use the appreciative words of W. G. Marshall, an English tourist, who gave an account of the Yosemite in his work, "Through America," which was published abroad eight or ten years ago.

The Nevada fall merits all the eulogy which has been heaped upon it by its admirers, for it is indeed a glorious leap, and one possessing some very remarkable and lovely features. It plunges 700 feet, yet this plunge is not perpendicular, for many feet below where it has topped the precipice, it strikes with its full force against a ledge of rock, and this causes it to shoot out anew into a still wider sheet; for, expanding now to a width of 200 feet, it descends the remainder of the distance in a network of fleecy curls, with an effect which is exquisitely beautiful, and which lends to the fall a peculiarly distinctive charm. The curled, crisp appearance of this fall constitutes one of the striking sights in the Yosemite. One might liken it to the arrangement or disposition of the sea waves as they gently break upon a flat, sandy shore. But to this must be added the active force with which each wave is thrown out; and then, if it is also borne in mind that there are hundreds of such wave jets in this one grand sheet—hundreds shot out at the same time followed by hundreds more while these are dying out of sight—some idea, incomplete though it will be, may be obtained of the remarkable form of this most beautiful fall.



PROFILE VIEW OF NEVADA FALL, YOSEMITE VALLEY.

Doetsch, the Longmaid-Henderson, or even the sulphatization in heaps, as practiced at many mines with profit and satisfaction? Were the ore as complex as those of C, there would be no room for such queries; but in this case, be it observed, it is the simplicity of the material that makes its treatment a matter of doubt and leads us to question the superior advantages in this instance of a process that, when used on complex ores, has no equal, and that becomes more and more useful in proportion to the complexity of the ore which it is designed to treat.

CASE II.

A very interesting case, parallel in some respects to that of "C," has been referred to me from a correspondent in Arizona. It is well known that in the Southern part of that Territory and in the northern part of the adjacent State of Sonora, there exists an extensive belt of base sulphide ores of a very intractable character, but so rich in the valuable metals, especially in silver, copper and lead, that their beneficiation is a very important matter. Such ores are being, or have been, produced at several

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

WILDMAN.—Amador Record, March 24: At the Wildman mine they have run seventy-eight feet south from the shaft on the 900 level and the ledge has continually widened out until now it measures thirteen feet. These developments are certainly very encouraging to the owners as well as to the people of Sutter Creek.

SUMMIT.—The Summit claim lies along the mother lode, and adjoins the old Eureka, which yielded \$75,000,000. It is less than a mile from Sutter Creek and on its southern boundary it also adjoins the South Eureka, lying between that and the original Eureka. An incline shaft was sunk 700 feet by the original owners, but after reaching that depth work was suspended owing to their inability to handle the water with the machinery in use and no work has been done since. The developments made at that time were more than satisfactory and furnished convincing proof that with suitable machinery for working the mine it would prove a valuable property. It is now owned principally by John and John R. Tregloan, both prominent and experienced mining men. They, with others, who are cognizant of the facts connected with the history of its former workings entertain no doubt as to its ultimately being developed into a big-paying enterprise. It is to be hoped that the owners will conclude arrangements whereby the mine may be worked.

LINCOLN.—The Lincoln mine is located near Sutter Creek and is controlled by American and foreign capital. For ten years the property has been leased and worked upon the tribute plan. At present the creditors of a deceased lessor are operating it under the superintendency of Robert Pope. The present lease expires next June and we understand that the company may then decide to work the mine themselves. The claim is 3000 feet in length by 600 feet in width. A shaft has been sunk 1000 feet and knowing ones say there is an abundance of ore in the mine from the 500 level down that will pay a handsome profit. The company own a water right consisting of ten miles of ditches; reservoirs; a milling plant of 40-stamps; two large hoisting engines, boilers and heavy pumping machinery. For several weeks past a representative of the company has been here investigating the affairs of the mine.

KENNEDY.—Amador Ledger, March 26: There is a report afloat that the Kennedy mine has been sold to an English company for \$2,000,000. The rumor, however, is not generally credited, but there is no doubt that negotiations are in progress looking to its purchase. At the Bright claim, the upraise from the tunnel has been driven to the surface, meeting with ore the whole distance. The quartz, which assays from \$6 to \$7 per ton, is thought to be good for at least a \$4 milling proposition, and with a large vein, such as is met with here, this certainly holds out a prospect for a big paying concern. The work now in hand is to sink the shaft below the tunnel, so as to tap the ore at a greater depth and determine its quality. George Gites, who is running the sulphurets-saving plant below the Kennedy mill, is arranging to leave next month to start up the Plymouth Rock mine, near Milton, Calaveras county. He will leave his works here in charge of experienced hands. Sidney James is running a small mine and 5-stamp mill above Pine Grove, with encouraging results.

Butte.

FIVE HUNDRED DOLLARS A TON.—Oroville Reporter, March 24: Wm. Fitch, of Oroville, visited the Rainbow mine at Yankee Hill on Sunday and made a thorough inspection of that valuable property by invitation of Superintendent W. H. Fowler. He brought back with him a number of samples of rich ore and informs us that the incline is down 170 feet on the ledge and that the deeper they descend the richer they find the ore to be. A crosscut has been run 70 feet and where the ledge is tapped it is six feet in width. Mr. Fitch says there are fully 200 tons of rock on the dump and from the results that he obtained by using a hand mortar he is satisfied the ore will average \$500 a ton. There is a six-stamp mill on the mine run by steam power, this was started on Monday of this week and will be run until a sufficient quantity of the rock has been crushed to give the mine a thorough test. Should it prove as valuable as it now promises a large mill will be erected during the coming summer.

THE BLUE LEAD.—Oroville Mercury, March 24: Billy Will brought \$250 in gold yesterday that was taken out by three men in one week from the Bishop mine on the Blue Lead at Bangor. All the miners there have splendid prospects and new ones are constantly being opened. The lead seems to underlay the entire country along the foothills between Bangor and the Feather river. No doubt many rich mines will be developed.

El Dorado.

DARLING.—Mountain Democrat, March 26: We get word that the Darling mine has closed down, perhaps temporarily. The vein is said to be large and ore of good grade, but it seems the mill does not give satisfaction, as it only works about ten tons in 24 hours. This is far too low for a ten-stamp mill. The average should be not less than 20 tons a day, and two men is quite sufficient to attend a mill working that amount of ore or even five times as much. Millmen sometimes make a mistake in reducing ore too fine. Rich gravel is now being taken out of the Stewart mine at Weaver Hill. A bed of gravel about 20 inches thick has been found by Mr. Zimmerman near the Pacific House, on the Lake Valley road. It has long been believed that there was rich gravel at that place, and there is no good reason why it should not extend along the ridge for miles. Work is progressing at the Toll House mine, near Smith's Flat. The water is being pumped out of the Rogers mine at the same place. Gregory Bros. have struck rich gravel in their mine, which is so far developed as to make it certain that they have a large amount of gravel ready to drift out. We get favorable accounts from the mines on the north side of the county.

Calaveras.

TO SINK.—Calaveras Chronicle, March 26: Mr. C. W. Caldwell, of San Francisco, is with us again. Mr. Caldwell is the owner of the south ex-

tension of the B. K. & D. M. Mauna mine. He is preparing to sink a shaft and then will erect a mill on the mine. We hope he will have a good mine. B. K. and D. M. Mauna are running a tunnel in their mine to tap the main shaft. Some very rich ore has been taken out of this shaft. The Hoosier mine is running in full blast, and it will be but a few days before the mill will be in operation. We have a few other mines here that will soon start up, and we think our little town will soon look up again.

PUTTING UP A MILL.—Calaveras Citizen, March 26: Messrs. Pellaton, Pfeiffer, Fisher and Wait, owners of the Democratic Gravel Mine, in Tunnel Ridge, are erecting a three-stamp mill and have it nearly completed. The mill purchased is the one formerly used on the Tuttle mine, in Chili Gulch. It will be but a few days before the mill will be in operation.

QUAKER MINE.—The work of sinking the vertical shaft in the Quaker quartz mine is progressing favorably under the careful attention and intelligent management of our friend Hugh McCoskey, who has been installed as the superintendent. The shaft will be sunk 200 feet, when it will then have attained a depth of 600 feet.

Inyo.

HIRSH.—Inyo Index, March 23: Developments in the Hirsh mine are very encouraging. Shipping ore is being taken out and indications point to a large body of high grade. A. W. D. Carroll, from Lone Pine, reports the work by Messrs. Mills, Austin & Co. as progressing favorably.

Los Angeles.

A SMELTER.—California Farmer-Miner and Oil Reporter, March 28: Yesterday, Maj. L. C. Moreland announced his intention of erecting a smelting plant in this city, and after consulting a number of prominent business firms in regard to the advisability of placing such a plant here in Los Angeles, met with such encouragement as to decide him that a smelter established here would not only pay him a handsome interest on the outlay, but would prove of inestimable benefit to the business interests of our city. At present, thousands of tons of valuable ore pass through Los Angeles for El Paso, Denver, Omaha, San Francisco and other points. All this ore could be smelted here at a much lower rate than at any of the points above mentioned, and a smelter of 20 tons capacity could be kept running night and day. Major Moreland is an old-time miner; has been raised in mines in Montana, old Mexico, and Southern California, and has accumulated quite a handsome competence, and feels confident that Los Angeles is the most available location for such an enterprise. Another reason why such a plant has so much advantage here is the fact that the natural gas just struck here would furnish motive power much cheaper than it could be obtained at any other point that has yet been mentioned.

Mono.

BODIE CON.—Bodie Miner, March 25: We are extracting ore of fair grade from upraise above south drift No. 2, 700 foot level, and from stope north of No. 1 upraise above the 500 foot Jupiter shaft level. The seams of ore in drifts continue good. We have commenced to extract ore from north of No. 1 upraise, 700 foot level. We will commence to crush Mono ore as soon as we get through cleaning up from test on Summit ore.

Nevada.

VULCAN MINE.—Grass Valley Telegraph, March 23: The Vulcan mine is situated between the North Star and Hudson By mines and has been leased by the following named persons. John G. Logan, John Edwards, W. J. Barker, Patrick Farrell, Geo. Browning, Wm. Thomas, Frank K. McDavid. The company is now drifting on the top ledge but will soon begin to sink for the bottom ledge. Ore from the Vulcan has always been of good quality and the ledge is from 10 to 14 inches thick.

A RICH STRIKE.—Nevada Transcript, March 26: John Skewes, superintendent of the Gold Flat mine, was in town to-day with some of the finest looking quartz we have seen for many a day. It came from the 300-foot level of the above mine. The specimens brought in show free gold and are heavily charged with galena and high grade sulphurets. The general character of the quartz is good, there being a "lively," rich appearance about it, which miners regard as a good sign. The ledge was struck a little below the old workings, and varies from twelve inches to two feet in thickness. Some years ago this mine was worked by Bruce Lee, who sunk a shaft down 300 feet and then ceased operations. It was formerly called the Potosi. A few months since the property was purchased by Grass Valley and Nevada City parties and a fine pumping and hoisting rig erected. The work of cleaning out and repairing the old shaft was begun and has not been entirely completed as yet. It was while the work was progressing, and a little prospecting at the same time, that the strike was made. The stockholders are highly elated over the prospects.

Placer.

DIVIDE MINING NEWS.—Plover Herald, March 25: We learn from a gentleman who has recently been on a tour of inspection of the Forest Hill divide that he found the mines of that section quite prosperous, and the outlook altogether encouraging. The pioneer quartz mine at Damascus, he says, has recently tapped the ledge with a new tunnel, at a lower level, and is taking out ore from a strong vein that will average \$75 a ton. At the Red Point drift mine, they are working over 50 men, and the mine is paying well. The Hidden Treasure is paying well at present, and is working about 40 men. At the Paragon, Breece & Wheeler's mine at Bath, the last clean up averaged \$4.02 to the car. At the Gray Eagle, the gravel is found to be so thoroughly cemented that it is thought they will have to erect a mill for crushing it. The Drummond quartz mine continues to yield rich rock from a strong ledge. At the Mayflower, they are, at present, doing a good deal of contract work in the way of opening new ground, etc.

Plumas.

RICH DEVELOPMENTS.—Quincy Bulletin, March 25: During the past few months, McGill & Standart have been running a lower tunnel from North Canyon into the Drury mine, to tap the chimney worked on a higher level. About ten days ago, the chimney was reached in this new level. It is reported to be a 7-foot ledge of high grade ore, estimated at \$25 per ton. This is an important development, both

for the lucky owners and the interests of the county generally, and for Indian valley especially. It will probably result in the erection of a large mill, near the bed of North Canyon, and the operation of the mine on a large scale. The quartz deposits west of the present workings, are practically inexhaustible. Backs of 1200 feet can be secured. The ore can be mined and milled at a small expense. Water power is handy and cheap, and plenty of timber is on the ground, thus giving every facility for the economical operation of the mine.

THE MERCURY.—Another very flattering quartz prospect has been found in the vicinity of Newtown flat. The location is called the Mercury, and was recently made by C. J. Lee, Chas. Blakesley and J. P. Richards, who are now developing it. The ore vein runs across the Fairstake, a gravel mine owned by Thomas & Thompson. Beginning in the bed of the Tate ravine, the ledge extends northwesterly toward Newtown flat. On the ridge, the owners have put a shaft down on the vein about 20 feet. It has not been sufficiently developed to judge accurately of the extent of the ore body, but in the ravine it is about 6 feet wide. The quartz extracted prospects about \$7 per ton. Development work will be continued.

San Bernardino.

SILVER REEF.—Press and Horticulturist, March 26: C. O. Barkeley and S. S. Nowlin, two of the directors of the Riverside Silver Development Company, returned last night from the Silver Reef mines on the desert, about 90 miles northeast of here, bringing with them a load of very fine carbonate ore that assays over \$700 per ton. Expert miners pronounce it the finest ore ever brought to Riverside. These gentlemen say they have a ledge of paying ore over 30 feet wide that will run from \$12 to \$40 per ton, milling ore, and a rich streak next to the hanging wall, from 8 to 22 inches thick, that will run from \$600 to \$1000 per ton of rich carbonate ore, such as they brought in.

ROSE.—Last week D. A. Wheeler, superintendent of the Rose mine, came in from the mine, bringing a gold bar weighing over 100 ounces. The company is now engaged in changing the plant from the dry process to the wet process, as by the latter they can work the ores much cheaper, and extract more of the valuable metal. As they go down, the vein shows up very satisfactorily. In running a crosscut, the workmen struck a 4-foot vein of ore that runs \$10 to the ton. As it will cost only \$2.50 per ton to extract and treat it, some idea may be gained of what a bonanza a 4-foot vein is. Next week, this mill will be running on the wet process.

San Diego.

JULIAN AND BANNER.—Julian Sentinel, March 26: C. E. Smith and George Plant are following a promising lead of quartz on the Ella, which may bring them soon into clover. A number of men has commenced work on the Madden, which has always turned out rich ore, and Dave Lane is opening up the Kentuck with fair prospects. It is in the air that the famous Golden Chariot mine which used to turn out \$75,000 to 20,000 per month—ore that went \$80 to \$100 per ton—is to be reopened. Al Frary and Bob Johnson have had their untiring efforts of the past many months rewarded by striking pay rock in the Eagle. They expect soon to have it come along now steadily richer and richer. The Antelope and Warlock mines are both idle at present, caused by circumstances unavoidable. Rich ore is found in both these mines and they should be worked every day. There has been a good deal of ore milled within the last year, the average being \$34 a ton. We understand that work will be resumed on these mines soon. The legal complications that have befallen the Helvetia mine have not as yet been determined, although rumors are rife to the effect that Mr. Havermale is negotiating with outside capitalists to pay off the indebtedness and start up the mine. The water is being pumped out each day and everything kept in running shape, so that at an hour's notice men could be put on and ore buckets again sent up the shaft.

Shasta.

AN EXCITEMENT.—Redding Free Press, March 26: From G. L. F. Reeo, of Round Mountain, we learn that there is quite a mining excitement in that locality. Nearly everyone has taken up a location. The ore carries silver and lead. While no well defined and extensive ledge of lead ore has yet been discovered, the prospects appear very flattering. A considerable quantity of rich float has been picked up by prospectors, and it is hoped that the all-important question of a smelter for Shasta county will be settled affirmatively by the discovery of large quantities of lead ore, it already having been settled that there are a number of coal deposits capable of furnishing large quantities of that important mineral. Parties from Grass Valley are negotiating for the Stowell gold and silver mine near Iron Mountain. Stowell has a rich and extensive mine and has been asking \$500,000 for it. He could have sold it for a less figure several times. The Hidden Treasure mine in the Iron Mountain district has been bonded to Messrs McCormick & Commore for six months, the consideration being something like \$40,000, provided a sale goes. Of course the mine will be developed and prospected by the bonders. This property is owned by Mat Hume, George Dix and a man named Hough. Our old friend E. P. Vanderveer was in Redding this week from Copely. Van and his partner, Mr. Bullard, are making money on Flat creek, working an arrastre on rich ore. He says that they have been averaging \$20 to the ton from rock by this old-fashioned process, not counting the large amount of gold that is lost. The Flat Creek district is very rich, but the gold is very fine and hard to save. R. G. Dunn has bonded his patented mine at Copper city to a man named McMillan for a period of ninety days. McMillan represents Eastern capital.

Siskiyou.

MINING ON HUMBURG.—Siskiyou Telegram, March 18: Hunt's new custom quartz mill on Humburg is now completed and will be started up next Tuesday, and will begin by crushing 30 tons of rock for Van Nader, after which about 50 tons will be crushed for Henry Marion. Fahl and Lawson are running an arrastre and crushing about a ton and a half a day of \$11 rock; their ledge is looking fine, and is about seven feet in width. Harrison and Tom Keaton are working the Harrison mine and are taking out some excellent ore. Some good ore is being taken out on the lower level at the Spencer mine. Cartright & Phillips are taking out some

very good ore at a depth of 250 feet. This last is conceded to be the best mine in the camp by mining men. B. B. Jackson is running a tunnel to strike the same ledge higher up the mountain. Andy Rabbitt and partner are taking out some very good ore on the old Schoolhouse ledge. They have also located the old Knapp mine, which they intend working. This last was rich, there being over \$60,000 taken out of it at one time. Mr. T. J. Baker and P. Donohue, on their mine which they have located, have taken out some exceedingly rich ore. The lode is between gneiss rock and porphyry, which is the best indication of a good paying mine. Van Nader is down between 15 and 20 feet on his lode, which is now about 3 1/2 feet in width, and is prospecting very well. The Humburg hills are full of prospectors and the outlook for the camp for the summer is very bright.

Trinity.

EAST FORK.—Trinity Journal, March 26: Supt. E. M. Hoffman is getting things in shape at Barney Gulch and will be ready to run the mill soon. At the North Star mine they have the tramway extended up to the Poorman mine, having nearly a mile of track laid. They are now building an ore bin and repairing the flume and ditch, and, when this is done, will be ready to start the mill on Poorman rock. Grant Day has a lease on the Fritz mine and has several tons of ore on the dump, which he will soon have crushed at the Enterprise mill.

GOOD WAGES.—Rohnerville Herald, March 23: Writing from Francis, New river, our friend McAtee says: Noble and son are making good wages on Pony creek. Shook & Co., on the same stream, are doing well. Information comes from a reliable source that work will be resumed on the Ridgeway when spring opens. Funds will be received from England to push the work. Aside: Two prospectors (first of the season) passed last Saturday on the way to Virgin creek, expecting to find the "Lost Packers' mine," said to have been richer than the "Pegleg" of Arizona desert.

Tuolumne.

THE BONANZA.—Tuolumne Independent, March 26: It is rumored that the Bonanza case will probably be settled within a week. A compromise will have to be effected, or the suit will shortly be brought to trial. It is to be hoped that an agreement can be had satisfactory to all parties. The property is valuable, the mine having already produced millions of dollars. The owners are very confident that there are other pockets not yet discovered.

NEVADA.

Washoe District.

CON. CALIFORNIA & VIRGINIA.—Chronicle, March 24: 1750 level.—In working out and upward from the bottom of winze No. 2 sunk from the 1650 level, we continue to extract ore of fair quality. Have also extracted some milling ore at the point where the upraise carried up from the crosscut run west from the southwest drift made connection with slopes on the eight floor. Have continued to extract ore of average quality at the point where the upraise from the southwest drift 70 feet north from the uth line of the California ground connected with the eighth-floor slopes. In the east crosscut No. 3 from the main south drift some ore has been extracted, 1800 level.—Along the south end of the drift running south from the crosscut run east from the winze No. 1 sunk from the 1750 level we have continued to extract ore from the sill floor upward of milling value. There has been extracted from all parts of the mine during the week 1025 49-5000 tons of ore, which was shipped to the Morgan mill. The average value of all of the ore worked at that mill during the week, 980 tons, was \$29 99 per ton. Bullion shipped to Carson Mint, assay value about \$16.657 36.

OPHIR.—1465 level.—From the end of the crosscut run east from the drift run north from the drift run west from the winze 122 feet below the sill floor of the 1300 level, an upraise has been carried up 26 feet in a porphyry formation and stopped. From the above mentioned north drift, at a point 35 feet in from its mouth, an east crosscut, No. 2, was started and has been advanced 15 feet, showing bunches and streaks of ore assaying from \$5 to \$10 per ton. Have continued the work of repairing and retimbering the main south drift on this level. Bullion shipped to the company's office in San Francisco, assay value, \$9,771 45.

MEXICAN.—On the 1465 level the crosscut running east from the bottom of the winze sunk 200 feet down from the end of the crosscut running west 132 feet in from the main north lateral drift near the south boundary line of the mine, has been advanced 11 feet; total length 166 feet, in hard porphyry and stopped. From this east crosscut, at a point 32 feet east from the winze a south drift has been advanced 12 feet in porphyry with quartz of low assay value.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. west drift from the shaft has been extended during the week 20 feet; total distance west from the shaft 1780 feet. The face is in porphyry. From the Union Con. south lateral drift from the joint west drift, at a point 1570 feet west from the shaft, a west crosscut started near the south line of the mine has been extended during the week 26 feet; total length 47 feet; the face is in clay.

UTAH.—The west drift from the shaft station, 340 level, was extended 59 feet; total length 337 feet; face in porphyry formation showing clay separations.

SIERRA NEVADA.—The joint Sierra Nevada and Union west drift, 900 level, is out west of shaft 1,780 feet; face in porphyry. The north drift from the Kenosha tunnel was advanced 40 feet; total distance, 797 feet; face in soft porphyry with some quartz and clay.

ANDES.—On the 420 level west crosscut No. 2, from north drift on east side of the ledge, has been advanced 20 feet; face in quartz and porphyry. Easting timbers in main north drift.

BEST & BELCHER.—900 level: East crosscut No. 1 has been advanced 22 feet; total length, 57 feet; face in soft porphyry and stringers of quartz. Have finished repairing west crosscut No. 1 and extended same 7 feet; total length 124 feet; face in porphyry and stringers of quartz.

400 level.—Northwest drift from west crosscut No. 1 has been extended 15 feet; total, 48 feet; face in soft porphyry, clay and quartz.

HALE & NORCROSS.—On the 900 level the north

prospecting drift started from the top of the north upraise, 50 feet above this level, was advanced 15 feet; total length 60 feet. This drift has connected with the Savage Company's ore slopes on our north boundary. Near our north line on this level are cutting out a winze to connect with the 1100 level slopes. On the 1500 level, No. 1 winze, started 75 feet north of the incline, was sunk 15 feet; total depth below this level, 30 feet; bottom in quartz and porphyry, giving low assays. On the 23d instant commenced shipping ore to the Brunswick mill, and have shipped to date 350 480-2000 tons. The mill began crushing on the 25th. During the week we have hoisted 233 cars of ore. During the month we milled 780 tons of ore at the Nevada Mill, yielding \$12,255 86 in bullion. Average battery assay of same, \$19 25.

CHOLLAR.—Are making repairs on the various levels. The south drift from west crosscut, 1640 level; is out 145 feet; face in porphyry.

POTOSI.—The winze is now down 146 feet below the 1500 level; bottom in soft porphyry mixed with quartz that gives low assays. The north raise, 60 feet south of north line, 1130 level, is up 30 feet; top in porphyry with streaks of quartz of good quality.

WARO COMBINATION SHAFT.—The southwest drift from the shaft, 1800 level, is out 1,275 feet, face in mixture of porphyry, clay and quartz.

ALPHA.—The west crosscut from north drift, 550 level, is out 16 feet; face in low grade quartz.

EXCHEQUER.—The east crosscut 150 feet south of north line, 600 level, is out 322 feet, face in porphyry.

BULLION.—Have completed repairs to south drift, 1300 level, and started an east crosscut, 350 feet south of north line, which is now in 10 feet; face in soft porphyry.

OCCIDENTAL.—The winze from west crosscut in the south drift 350 level is down 30 feet; bottom in pay ore. The crosscut on the 400 level, started to meet the winze sunk from the 350 level, is in 29 feet and continues in pay ore. The crosscut from north drift, 750 level, at a point 300 feet from the station is in 12 feet; face in low grade ore.

CON. NEW YORK.—The raise from No. 4 west crosscut, 650 level, is up a distance of 71 feet; top in quartz showing bunches of fair ore.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 610 feet; face in gypsum and porphyry.

SAVAGE.—During the week we have hoisted 785 cars of ore from the 750, 950, 1150 and 1400 levels, and shipped to the Nevada mill, 666 tons; milled 665 tons; average battery assay, \$17 85. Bullion yielded for the week, \$8,316 70.

CROWN POINT.—The east crosscut from the top of the raise, 500 level, has been extended in a total length of 54 feet at which point it was stopped; face in porphyry. Have started a south drift from No. 1, west crosscut, 160 level, and are out now 36 feet; face in soft porphyry, with streaks of pay through it about 8 inches wide, giving good assays.

BELCHER.—We are saving some pay from No. 2 raise, 300 level, and opening out on the second and third floors. Are timbering the 1300 level slopes from the south raise.

KENTUCK.—The north drift, 160 level, is now out a total distance of 164 feet, at which point it was stopped and an east crosscut started from the end of it, or at a point about 30 feet south of the north line. This crosscut is out 22 feet, and the face in porphyry and low-grade quartz of a favorable appearance.

JUSTICE.—The west drift, 490 level, is now out a total distance of 720 feet; face in hard rock. There has been no work done in the raise from the 822 level during the past two weeks as we are engaged in taking out the old pump column from the north compartment of the shaft.

CONFIDENCE-CHALLENGE.—The joint Confidence-Challenge west crosscut from north drift, 200 level, is out 130 feet; face in porphyry. The joint Confidence and Challenge raise from the north drift, same level, is up 7 feet, having been commenced during the week; top in quartz of no value.

SCORPION.—The joint drift from the 900 level of Union shaft was advanced 10 feet during the week, making its total 747 feet. The ground is softer and requires timbering, which has delayed the usual progress in advancing the drift.

SEG. BELCHER.—The raise from south lateral drift, 1300 level, is now up a total distance of 27 feet; top in porphyry with streaks of quartz through it assaying from \$5 to \$15 per ton.

YELLOW JACKET.—Shipping to the Brunswick mill 35 tons of ore daily. The usual prospecting is being done.

IMPERIAL.—We are taking out some fair ore from streaks and the old fillings on the upper levels.

Ferguson District.

WORK COMMENCED.—Correspondence White Pine News, March 26: I am now located in this new mining district, which is about forty miles south of Bristol and about the same distance from Pioche and Hiko. Real work began here about the first of this year, though some prospect work had been done the past summer, and assays obtained that went as high as 1716 ounces in silver and \$5 in gold, out of the Discovery claim. Since we came here January 1st last, several other miners and prospectors have come here and been prospecting and opened their new finds. Many new claims have been located that promise to be of great wealth. There are now six mining claims being worked and every one of them has found rich born silver ore and yellow chloride in veins running from two to six feet wide, and every man here is excited to the highest pitch. Since we came here assays have been obtained running as high as 1974 1/2 ounces. The formation is porphyry, slate and lime, with plenty of quartz and granite. The ore lays in what miners call a contact between slate and porphyry. The camp is all alive and many coming and more talking of coming with stocks of supplies, and we hear of two parties intending to put up a quartz mill here in the near future.

Bristol District.

LEACHING ORE.—Correspondence Pioche Record, March 26: John Savor of the Mayflower mine says he has an abundance of leaching ore on hand ready to extract and can obtain samples of ore all the way from 30 to 300 ounces of silver to the ton. The Mayflower was worked by chlorides years ago, who extracted a large amount of good ore therefrom which they sold to the Bristol smelter, realizing handsome profits upon it. The mine fell into litigation and judgments were rendered against its own-

ers, which were purchased by John Roeder, John Savor and others. Mr. Savor will put the mine in shape this summer for advantageous working upon the advent of a railroad to Pioche.

LEASE.—James C. Nicol has taken a lease from Tom Gillan on the old Michigan mine near Bristol, and will proceed at once to work on the property. Mr. Nicol thinks there is a good showing for some pay ore, and was in town this week getting supplies to begin work. No work has been done on this property for a number of years, it, like a good many others, being relocated every year, instead of being represented by labor. When a railroad comes here and our resources are known to others, that kind of representing won't do. It will have to be done with a pick and shovel and not with a lead pencil.

Glencoe District.

PROMISING.—Salt Lake Journal, March 26: Glencoe Mining District, in White Pine county, promises to come to the front this season as one of Eastern Nevada's banner camps. A number of fine mineral deposits have been uncovered there, and if mill-run tests of ore soon to be made in Salt Lake are satisfactory, as anticipated, it is safe to predict that there will be a boom for that region equal to that now raging at Creede and Cripple creek, Colorado.

Tuscarora District.

NAVAJO.—Times-Review, March 25: No. 2 winze, 350-foot level, extended 10 feet, showing small seam of good ore. No change in the other workings.

BELLE ISLE.—The crosscut from No. 1, 350-foot level, extended 12 feet. West crosscut, same level, extended 19 feet.

NORTH BELLE ISLE.—West crosscut, south 400, extended 11 feet. North intermediate drift above the south 500-foot level, extended 19 feet, the face is looking better than at last report. No. 4 drift south, 500-foot level, extended 14 feet. West crosscut, same level, extended 13 feet. Hoisted 29 cars second-class ore.

DEL MONTE.—Second level—No. 4 raise from stope extended 30 feet, showing seams of good ore and looks very favorable. Hoisted 14 cars of second-class ore, assay value \$51 per ton. Third level—No. 1 raise has been advanced 30 feet, top is in vein matter.

NORTH COMMONWEALTH.—Second level—Footfall raise from north drift put up 15 feet, exposing seam of good ore, produced 14 cars of good ore, assay value \$49 per ton.

MONTANA.

BUTTE MINES.—Montana Mining Journal, March 23: A new water column was placed in the Mountain View shaft a few days ago. During the week the Lexington Company shipped 15 bars of bullion of an estimated value of \$24,000. The water in the Alice was lowered to the 1500 floor yesterday, which will permit of access to this level. The Montana Consolidated mine, which belongs to the Anaconda Company, has been adorned with a new pump. The Hibernia is being worked through the shaft of the Nettie. Both properties belong to the Colorado Company. Superintendent Helehan, of the Emma Nevada in Loop Gulch, reported work progressing in the 200 of that property. Samples of ore from the vein of the Pandora in the Camp creek district, assay as high as 9000 ounces per ton. The ore is a black sulphide and is found only in small doses. A shipment of 150 ounces ore was made from the Brackstone last Saturday. This is the first shipment made from this mine, as it has only recently been opened up. The Blackstone is situated northwest of Walkerville. The new shaft for the Anaconda hoisting engine was shipped from the East last Thursday morning. Work at the mine, it is thought, will be resumed on the 2d of April. The Biston and Montana Company will soon commence to increase its force at the Mountain View and Harris-Lloyd properties, to which spurs of the railroad are now being built. By the time the spur work is finished the force of the former property will be double what it is now. A specimen of copper glance weighing 1800 pounds was shipped from the Mountain Consolidated mine to Baltimore a few days ago. From there it will be sent to France for exhibition. The ore was taken from the mine about two years ago, since which time it has been kept on exhibition in the hoisting works.

NEW MEXICO.

HANOVER IRON MINES SOLO.—Southwest Sentinel, March 24: A deal which has been going on for some time has been consummated. Thirty-one iron mines in the Hanover district were sold to a syndicate of Pennsylvania capitalists for \$110,000. Of the mines sold nine belonged to W. H. Newcomb and nine to John Bockman, both residents of this city. The deal was closed by Lewin W. Barringer, a Philadelphia attorney, for the purchasers, and the mines were transferred to John W. Brock as trustee for the company. The mines purchased comprise most of the valuable iron mines in the Hanover district, and they are believed to be the best iron mines in the Territory. The ore runs about 60 per cent iron, and has been used extensively by the Socorro and El Paso smelters for fluxing purposes. Just what the purchasers of these mines propose to do with the ore is not known, but for the present at least they will continue to fill the contracts for ore which were made by Mr. Newcomb and which have been turned over to the company in the deal. These contracts amount to about 30,000 tons per annum. The company will purchase the Silver City and Northern railroad if possible, but, failing in that, will build a new line from Hanover to this place over which to ship their ores. The speedy development of the Hanover iron mines is now assured, and if the company should build a railroad from Hanover to this place there would be sharp competition for the Hanover business and more favorable rates could be obtained for the shipment of copper and zinc ores from the Hanover mines. The silver City and Northern railroad company owns a number of iron mines in the Hanover district, and there are some in the camp which are still owned by individuals who do not appear to be anxious to sell. The greater part of the money paid for these mines has been paid to residents of this city and will be used in the development of the resources of the country. Mr. Newcomb will work with the new company and will soon leave for the East on important business.

The California Miners' Association.

Officers, Committees and Constitution and By-Laws of the State Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized. The officers of the Association are as follows:

HON. J. H. NEFF.....President.
W. C. RALSTON.....Secretary.
THOS. B. EVERETT.....Ass't Secretary.
H. PICHOR.....Treasurer.

VICE-PRESIDENTS.

NAME.	COUNTY.
R. F. Grigsby.....	Napa
Henry Martin.....	Trinity
Geo. W. Thomas.....	Marin
Frank R. Wehe.....	Sierra
Woolston Banghart.....	San Mateo
R. H. Campbell.....	Siskiyou
Jas. O'Brien.....	Yuba
Frank Fitzgerald.....	Inyo
A. B. Call.....	Amador
Dixon Brahban.....	Plumas
J. F. Ryan.....	Humboldt
Aaron Bell.....	Shasta
H. O. Harvey.....	Sacramento
D. K. Perkins.....	Butte
A. M. Hardie.....	San Luis Obispo
A. Tregldgo.....	Nevada
Ex-Gov. H. G. Blaisdell.....	Alameda
T. B. Morse.....	Calaveras
Hon. A. M. Clerk.....	Fresno
Hon. J. K. Luttrell.....	Sonoma
J. J. Crawford.....	El Dorado
R. M. Folger.....	Mono
Geo. F. Hoyte.....	Orange
R. McMurray.....	San Francisco
W. S. Chapman.....	San Francisco
I. C. Stump.....	San Francisco
C. T. Lacy.....	San Francisco
A. J. Ralston.....	San Francisco
John W. Maxwell.....	Tuolumne
Hon. R. Clark.....	Colusa
C. F. Reed.....	Pleasant
Chas. Bogan.....	Mariposa
James H. Lawrence.....	Merced

EXECUTIVE COMMITTEE.

Hon. J. H. Neff, Placer.	H. A. McCraney, Lake.
Louis Glass, San Francisco.	Jas. Tunstead, Marin.
Cal Dan M. Burns, S. F.	A. M. Bryant, Mono.
Col. F. McLaughlin, Butte.	W. K. Aldersley, Napa.
S. K. Thornton, S. F.	Chas. Bogan, Mariposa.
Wm. Ireland Jr., S. F.	Jas. H. Lawrence, Merced.
Hon. C. W. Cross, Nevada.	Hon. J. M. Walling, Nevada.
Chas. G. Yale, San Francisco.	D. C. Fixel, Orange.
J. B. Hobson, Placer.	John Spaulding, Placer.
Hon. Edw. Coleman, Nevada.	W. W. Kellogg, Plumas.
Hon. A. Walrath, S. F.	M. M. Drew, Sacramento.
Hon. J. K. Luttrell, Sonoma.	Thos. R. Church, S. F.
Ex-Gov. H. G. Blaisdell, Alameda.	John Hays Hammond, S. F.
H. N. Jno. Daggett, Siskiyou.	Myron Angel, S. L. Obispo.
Hon. E. C. Voorheis, Amador.	N. J. Brittan, San Mateo.
E. W. Fogg, Butte.	George M. Pinney, Sierra.
John F. Davis, Calaveras.	R. G. Hart, Shasta.
John Boggs, Colusa.	A. W. Dana, Sonoma.
Hon. Thos. Fraser, El Dorado.	A. Hewell, Stanislaus.
Mr. McDonald, Fresno.	O. P. Berry, Sutter.
W. H. Pratt, Humboldt.	O. McFarlane, Tuolumne.
Hon. Patrick Reddy, Inyo.	G. O. Kimball, Tehama.
J. O. Miller, Kern.	John McMurray, Trinity.
	O. G. Mayo, Yuba.

FINANCE COMMITTEE.

Louis Glass, San Francisco.	Edward Coleman, Grass Valley.
Wm. Ireland Jr., S. F.	S. K. Thornton, S. F.
N. J. Brittan, San Mateo.	John Hays Hammond, S. F.

COMMITTEE TO FORMULATE AND PROMOTE THE ADOPTION OF AMENDMENTS TO MINING STATUTES.

Hon. Niles Searles, of Nevada.	H. I. Thurwell, Placer.
Hon. O. W. Cross, S. F.	Hon. J. K. Luttrell, Sonoma.

COMMITTEE OF CONFERENCE WITH RIVER AND HARBOR CONVENTION COMMITTEE.

R. G. Hart, Shasta.	Wm. Ireland Jr., S. F.
Frank McLaughlin, Butte.	J. B. Hobson, Placer.
Hon. J. K. Luttrell, Sonoma.	

DELEGATES TO WASHINGTON.

Hon. Niles Searles, of Nevada County.	
Hon. J. K. Luttrell, of Sonoma County.	
Robert McMurray, of Nevada County.	
J. B. Hobson, of Placer County.	

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

Sec. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of the organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of eleven members selected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

Sec. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

Sec. 3. The President and Secretary of the Association

shall hold *ex officio* President and Secretary of the Executive Committee.

Sec. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of this Association.

Sec. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein prescribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

Sec. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall render annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

Sec. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by the President and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of the Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at the city and county of San Francisco.

Sec. 2. It shall be the duty of the Vice-Presidents of this Association to at once proceed to the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

Sec. 3. All persons friendly to the mining interests are eligible to become members of this Association. In the event that there is no County Organization, such person may unite with the State Association by forwarding his name to the Secretary thereof, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

Sec. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected as such County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by the Executive Committee, Jan. 22, 1892.

BY LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittees as they may determine. They shall fill all vacancies of the officers of the Association or members of any committees. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

Sec. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of the annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

Sec. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

Sec. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

Sec. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

Sec. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of such intended meeting.

Sec. VII.—The Secretary and Treasurer shall receive such compensation for their services as the Executive Committee may, from time to time, determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22d, 1892.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F., Stock Exchange Building.

MECHANICAL PROGRESS.

Machine Mining.

Lewis Stockett, of St. Louis, Mo., contributes to the *Colliery Engineer* an article on "Machine Mining," from which we take the following:

Ten years ago, in this country, machine mining was looked upon almost entirely as an experiment in which few had any faith, or were willing to hazard capital in. To-day the experiment has become an assured success, and machine mining is fast becoming the rule and not the exception. In the State of Illinois, for the year ending July 1, 1890, out of a total of 12,638,364 tons mined by all methods, 2,881,983 tons were mined by machinery, being 23 per cent of the total. In the Fourth Inspection district of this State for the same period, of a total of 3,716,464 tons mined, 1,615,453 tons, or 43.5 per cent of the total, were mined by machinery; and in the Fifth Inspection district, covering the same period, of a total of 3,240,204 tons mined, 1,101,262 tons, or 34 per cent of this total, were mined by machinery; and succeeding reports will show increased percentages.

Pennsylvania, Ohio, Indiana, Michigan, Iowa, Missouri, Kentucky, Alabama, and several Western States, will show percentages, that, compared with previous years, will show that machine mining is steadily increasing, and there are scarcely any of the coal-producing States or Territories of the Union where machines are not being or have been used with more or less degree of success, in other respects as well as financially, when under proper conditions, and earnest effort has been made to make them succeed.

Ten years ago the miner that worked with or after machines was a "blackleg" to be shunned by his fellow-workmen, and often followed his occupation at the risk of the "boycott," personal injury, and even loss of life from those opposed to the innovation. This has all changed, and to-day the machine miner and laborer form a large portion of the mining class, and are often the commanding influence. Where machine mining has been successfully organized and carried out, the result has been greater regularity of work and better wages for employes.

So far, machinery for mining is confined to machines for "undercutting," "shearing" and "drilling," and which, by cutting the vein horizontally or vertically, and drilling the holes for blasting, prepare it for the work of the miner in charging, blasting, assorting, loading, and timbering. Machinery for these latter purposes has not been introduced, though experiments are continually being made with machines for loading, and the writer has seen two patterns that in a large vein with good roof would do the work very well; it is to be hoped that a successful machine will finally be devised to relieve this the most laborious portion of securing coal. The cleaning of coal from its impurities, where the same exist, and throwing them back into the gob is a task that can hardly be accomplished by machinery, which can only be expected to lift the mass from the floor and deposit it in the cars. Where these impurities do not exist in too great an amount, the cleaning can be done more thoroughly and more economically by proper coal-cleaning machinery placed in the tipples outside.

Electric batteries for firing blasts after the charges are tamped, and the use of lime cartridges and power wedges for breaking down the coal may be mentioned as attempts to do the breaking down by machinery, but have not come into general use.

For timbering, machinery has nothing to offer, and it is only indirectly that a saving can be effected in this department of the work; by deep undercuttings, the roof if tender is shattered less by the blasts; and as machine mining gets over the ground much quicker than the older method, rooms are driven their length and finished before timbers need replacing. To offset this, places for machinery are generally driven as wide as possible, in order to give the machine the advantage of working steadily and preventing the loss of time in moving frequently from one face to another; this will take more timber, and it becomes a nice point to determine on the score of economy just where to draw the line between the two.

The power used to operate mining machinery has been almost entirely compressed air. Of late electricity has become a recognized factor as such, and there is no doubt but that in time with improvements in application, it will become more and more so. At present the most successful machinery being driven by compressed air necessitates its use, and for this reason is preferred by the writer.

Diversity an Industrial Factor.

There is nothing stationary in industrial conditions. They are in perpetual motion, and the panorama of changing production is an endless exhibit on a ceaseless wheel. There is nothing stereotyped or perfect in human ingenuity, and one invention succeeds another, as the clock of time strikes each succeeding hour. The age is inventive, and the skill of modern man has its aims and emoluments in that direction. There are no fixities along this line, except the industrial fact that products or appliances in their manufacture have no mortgage on the future. What is supreme in the market to-day may be in the underflow to-morrow. It is on this grindstone that competition sharpens its knife and makes its mince-meat of men who fail to appropriate the advantages of new and progressive methods. So wide and vital are these changing conditions that it has become an economic necessity to increase and diversify the specialties of manufacture so as to reap a dollar from the seed of a hundred cents. Public enterprise is generally in response to this industrial and commercial necessity.

The farmer finds financial anchorage in a diversity of crops, and when one fails in product or price he pays his taxes and buys his boots from the increased value of the rest. The merchant adopts the same procedure, and finds his prosperity enhanced by introducing variety into his business, and in manufacture it is equally as necessary. In the established staples of production, elasticity is a law of success, and where the man of business ignores these flexible conditions, he dries with the pea that fails to grow with the pod; in other words, his business stagnates, and if sustained for a period at a loss of time and money, is inevitably destined to starve itself to death. There is no lack of such corpses in the financial graveyard, and perhaps too many men living to-day, by being too conservatives in their modes and methods, are simply postponing their funeral expenses. Hence it is necessary to multiply the lines of product in many of our industrial establishments, and thus avert the consequences of glutted markets or no demand.

The escape is in diversity. The class of goods that make a successful run one season is generally supplemented by a reaction of over-supply in the next, every man reaching for the same big plum. It is but a logical sequence to these fluctuations that a combination of interests where several varying lines are amalgamated is good business policy when wisely carried out. This places the manufacturer in command of the varying phases of public demand, by giving him a wider range of products with which to meet existing mercantile conditions, and thus insure more stability and a wider range of operations. It is wise to recognize the logic of events in this instance, and keep pace with the march of progress and public needs, and in no one direction is the line of security and prosperity so accurately drawn as in the deployment of industrial products. —The Lumber Worker.

THE BANDSAW MILL.—How rapidly the band mill has converted the mill owners of the country! Conceived with the idea of saving a reasonable percentage in the sawing of walnut and a few other valuable cabinet woods, it is now, by long odds, the mill of mills, says the *West Coast Lumberman*. The first manufacturers of this band mill had a long and weary struggle against the deeply rooted prejudice in favor of the circular. Then, when it demonstrated that it would really do good work in the afore-said cabinet woods, at a considerable saving of lumber, the white pine men said it would never be fast enough for their use. But they were quickly won over to its favor. Then the yellow pine and cypress men said it would not do in their timber, but experience proved them wrong. The millmen of the Pacific Coast were certain it could never be made a success in the redwood and fir of their region, but it is noticed that it is going into their mills right along, and they are beginning to brag about the big cuts they make with it, and this last victory makes the band mill almost complete master of the situation in the United States.

THE BROWN GUN.—The system of great gun construction, known as the Brown segmental tube wire-wound method, which, it is claimed, is destined to revolutionize the fabrication of heavy ordnance, has undergone a completely successful trial, under Government auspices, at the works of the Pennsylvania Diamond Drill Manufacturing Co. at Birdsboro, Pa. The Brown gun is to be constructed of a tube of accurately adjusted segments of steel, extending from breech to muzzle, wrapped with many layers of steel wire, applied under heavy pressure,

and lined with an inner tube to carry the rifling and endure wear and tear of repeated firing. A complete gun has not yet been finished, but a sample cylinder, representing the powder chamber of a five inch gun, was subjected to the trial yesterday. The external diameter was a trifle under 16 inches and its length about two feet. Three and a quarter pounds of powder gave the enormous pressure of 52,850 pounds to the square inch. The highest pressures used in modern guns does not exceed 35,000 pounds. *Manufacturers' Gazette.*

SCIENTIFIC PROGRESS.

A Ships' Compass.

It is said that much of the unsteadiness of ships' magnetic compass needles can be obviated by the following device: In place of one needle, or set of needles, there are several mounted concentrically one above another. The vibrational period of each needle, or set of needles, is slightly different from that of the others. The lowermost needle carries a pair of stops, which project upward so far as to embrace all of the other needles of different vibrational periods, and so as to prevent them from moving independently through more than a limited number of degrees. The weights of the several needles are so proportioned as that the momentum of each is, in the normal condition of vibration, about equal to that of the others. The swing of such magnetized needle is, of course, hampered not only by their mutual attractions, but also by the stops before mentioned, that are affixed to the lowermost needle. The result is that—the vibrational periods of the several needles not being commensurate one with another—the whole combination has virtually no vibrational period. The combination is not free to respond to any single isochronous swing. The attempts of any individual needle to assume such isochronous motion are frustrated by the interferences of the other members of the combination. There are various methods of mounting the needles, which, however, it is hardly necessary that we should describe. One objection that we see to the device is possible derangement by a sudden jerk, etc.

An Artificial Aurora.

An experiment showing "molecular bombardment" and the "aurora" may be made by rubbing an incandescent lamp on this clothing, or on paper, leather, sheet rubber or tinfoil, when the bulb will become filled with light; if you stop, it grows dark. If touched with the finger, the filament and the interior will be a bright glow, lasting from one to three seconds; if touched again, it is repeated; by drumming or drawing the finger slowly over the glass, the light is quite continuous. If rubbed on newspaper in an absolutely dark room, the larger letters can be read at a distance of two or three inches. Fan the bulb with a sheet of rubber eight or ten inches away, but do not touch the glass; it will light the same quite bright if the fanning is very rapid.

The lamps used were the 16 c. p., 20 and 22 volts. Most of the miniature lamps will give the light, but not all; the 110-volt store lamps will not.

It is evidently charged through the glass, as the glow will occur if the metal parts are enveloped in rubber. Everything used should, of course, be dry. It seems to be an electrophorus effect, the discharging only exhausting a section at a time. —T. B. Heimstreet in *Electrical World*.

MANGANINE.—Manganine is the name of a new alloy, consisting of copper, nickel, and manganese, which has been brought on the market, says *Iron*, by the German firm, Abler, Haas & Angerstein, as a material of great resisting power. The specific resistance of manganine is given as 42 microhm centimeters, that is, higher than that of nickeline, which has hitherto passed as the best resisting metal. Another advantage of manganine is its behavior under variations of heat, the resistance, it is claimed, being affected only in a minute degree by high temperatures. It is therefore adapted for the manufacture of measuring instruments and electrical apparatus in general, which are required to vary their resistance as little as possible under different degrees of heat. A further interesting fact is that, while other metals increase their resistance by the raising of the temperature, that of manganine is diminished.

NEW ALLOY.—A French contemporary is experimenting with a new alloy for armor plates, projectiles and guns, viz., a steel containing one per cent of chromium, two per cent of nickel and not more than

0.4 per cent of carbon; the steel is first melted in an open hearth, and in the ordinary way. When the silicon and manganese in the metal have attained their proper proportions the nickel and chromium are added successively in the form of ferro-nickels and ferro-chromes, or in the shape of a double ferro-chrome and nickel.

DO WE TEACH GEOLOGY.—The cultural aspects of civilization are due to geologic structure, but in how many of our institutions are students taught to appreciate topography or configuration of the earth's surface and its relation to structure, or to observe with inquiring eye the forms and contours of this landscape? The student usually learns the chemistry of certain nicely-arranged hand specimens of hard rocks, and memorizes the names of leading fossils, or the crystallography of minerals under the guise of economic geology. As a result, the study is supposed to be merely the study of hard rocks and curious fossils. Although the student knows these by sight, he cannot trace a rock-sheet above the ground or below it, or see the great soft terenes void of fossils and rocks which make up this larger area of our country, and cannot appreciate the broader relations of structure to agriculture, hygiene, climate and civilization. Hence, the great unfossiliferous terenes are unknown; for example, the nonmountainous regions of the West and South, over which in places one may travel from the Rocky Mountains to the Gulf of Mexico without finding a fossil, a crystal, or a building stone. —Robert T. Hill.

OCEAN DEPTHS.—The eight or nine mile depths in mid-ocean, declared very probable by Maury, are not found by later actual investigation, according to the *Engineering News*. A depth of five to six miles is very exceptional, and the average appears to be about 2,500 fathoms for the waters of the globe. The greatest depth yet found is 4,575 fathoms (5.2 miles) south of the Ladrone, and 4,561 fathoms north of Porto Rico, near St. Thomas. The deepest sounding, then, in the North Atlantic, is 4,561 fathoms, and in the South Atlantic bottom is always found at a less depth. The Mediterranean gives 2,150 fathoms as a maximum to date, and the deepest known water in the Indian Ocean is 3,199 fathoms. The polar basin seems to grow shallower as the North Pole is approached, and bottom was found at 72 fathoms in the most northern sounding made. These soundings, so far as made, also disprove the theory that the ocean bottom is a counterpart of the dry land in its irregularity of surface. It has its peaks and deep gorges, but as a rule, the surface lies in very gentle undulations, without abrupt or steep slopes.

SUNSPOTS AND MAGNETIC DISCHARGES. In a recent communication to the Academie des Sciences, M. Janssen, the eminent French solar astronomer, stated that he saw nothing in the facts hitherto brought to light to warrant the hypothesis of there being any relation between sunspots and terrestrial magnetic disturbances. He was not, however, prepared to dogmatize on the subject, but would prefer that inquiry should be made of foreign meteorologists if at the time of the fine aurora recently observed in America and Europe, magnet disturbances took place also in the Southern hemisphere. If it were thoroughly ascertained that nothing of the same kind took place in the Southern hemisphere, M. Janssen was of opinion that we would be in possession of a fact which would render the theory of solar influence a very improbable one.

PURIFICATION OF CHEMICALS BY COLD. Pictet, who has taken out a patent for the process, has discovered that from the purest chloroform of commerce, if cooled down to about 70°, there separates out a crystalline body, which is then drained from the part which remains liquid. This liquid portion is then exposed to a temperature below -100°, when the chloroform itself crystallizes out, and can be separated from an impurity which remains liquid. Chloroform purified in this manner is a colorless liquid, having at 15° the sp. gr. 1.51. It is indefinitely permanent on exposure to light, while the so-called pure chloroform of commerce takes a greenish color if shaken up with solution of potassium dichromate and sulphuric acid. If Pictet's chloroform be similarly treated the chromic mixture retains its yellowish color.

NITRO-JUTE is a new explosive, invented by Mr. Otto Muhlhäuser. He treats one part by weight of jute fiber with 15 times its weight of a mixture of nitric and sulphuric acids. This product, which weighs about 30 per cent more than the original fiber,

takes fire at a temperature of 167 to 170 degrees C., and contains about 12 per cent of nitrogen. It is of a brownish-yellow color, and the composition is given by the author as $C_{12}H_{15}O_5(ON_2)$. It explodes by percussion like gun cotton, and is insoluble in water, ether, benzine or alcohol, but dissolves readily in acetic ether and nitro benzine.

ELECTRICITY.

Pumping Water to Operate Dynamos.

Prof. George Forbes, the great English authority on electrical transmission of power, in the Fourth Cantor lecture, recently delivered, mentioned a custom which prevails at Geneva, Switzerland, where the waters of the river Rhone are utilized in a unique way to generate electricity. Where the waters leave the lake the fall varies from 6 to 12 feet. To utilize this small fall, very large turbines had to be used. The plant consists of 20 of these, which pump water up to a reservoir three miles distant, which gave a large head. The water is then distributed in pipes throughout the town and supplies power direct to many of the industries, among which is the electric lighting company, which found it cheaper to rent their power from the existing company than to install a pumping plant of its own.

Consequently, there was presented the unusual arrangement of the electric lighting being done by turbines on the Rhone, pumping water to a reservoir several miles distant, the water coming back to within a short distance from whence it was pumped, and there driving turbines again which turned the dynamos that light the city. One would be inclined to think that such a method would be uneconomical even where water power was employed to do the pumping, and certainly out of the question if steam engines had to be employed, but Prof. Forbes says that as a matter of fact such an arrangement would be economical. He argued that when steam engines are used direct, a great deal of the value of the coal that is burnt is lost, first, because the engines are running light during a portion of the time, and second, because the boilers are consuming far more coal for the amount of work done than they would if the boilers were continually working.

It was his opinion that a case might arise where a decided economy might be effected where, instead of putting down a sufficient number of boilers and steam engines to supply the maximum current, a smaller number employed continuously in pumping the water to a given height would answer the purpose quite as well or better. In operating a station requiring a maximum of 1000 H. P., they did not require, on an average, more than a 150 H. P. In this particular case, they would have a steam plant of 150 H. P. working day and night, and from week to week, pumping up water into the reservoir; thus, instead of engines of 1000 H. P., those of 150 H. P. could be substituted at a great saving in capital outlay. The only offset to the increased cost of the larger plant would be the outlay for pipes to and from the reservoir, which, in the case cited, might amount to something like \$10,000.

He said that the saving would not only be material in the original outlay, but that there would be a considerable economy in the running expenses. An engine and boiler continuously pumping water would be working in the most economical manner. By this means it would be possible to obtain power with very little more expenditure than three pounds of coal per H. P., whereas in central stations they often went up to 10 or 15 pounds of coal per H. P. He had gone into the matter very carefully in the case of Edinburgh, and that he not only hoped to see the authorities there adopt it, but hoped that some such scheme would be adopted in other towns. In working out the scheme for Edinburgh, he said that if the water were first pumped to the reservoir by steam and then utilized as suggested, the capital outlay would be a little more than one-half that involved in a steam plant sufficient to do the work direct, besides there would be a saving in attendance and fuel.

SYNCHRONOUS MOTORS.—Great stress has often been laid on the idea that a very excellent quality of synchronous alternating motors lies in the fact that their speed must of necessity be exactly the same as that of the generator. While such a quality is undoubtedly a good one, it should also be remembered that it is attended by a serious disadvantage which constructors should bear in mind in designing the machinery for such systems. The fact is well known that if overloaded too much, such motors come

to a dead standstill; this, makers say, is not serious because if well constructed a motor should be able to stand an overloading of 100 per cent before the speed falls. According to a competent authority, there is another feature, however, which he claims is a great source of trouble in existing plants. He claims that if the speed of the engine varies, say it diminishes momentarily, then that of the generator will fall and as it rises again a moment later the motor, if it has a heavy armature, will not be able to follow as quickly as necessary, thus throwing the two out of synchronism. He claims that much of the trouble experienced with synchronous systems in use is due to this cause. In order to avoid this, it appears that the fly-wheel action of the armature of the generator should be as great as possible and that of the motor as small as possible, so that the former will tend to maintain an even speed and the latter will tend to respond quickly to any changes should they occur.

Electrical Engineers.

Said a prominent member of the American Institute of Electrical Engineers not long ago: "The developments in electrical science and practice come so rapidly that I despair of keeping up with them. A couple of years ago I considered myself fairly well posted as an electrical engineer, but my time has been taken up in other work since that time, and I feel now like an ignorant amateur in discussing electrical problems."

Certainly if electrical engineers find it difficult to keep abreast with the progress in their peculiar field, says the *Engineering News*, mechanical and civil engineers may be expected to abandon the task entirely. But while this may do for the older members of the profession, who have made their reputation in special lines and find abundant occupation in keeping up with the progress in their own specialties, every young engineer who aspires to something more than mediocrity, should gain all the information he can on the progress of electrical work.

It is not meant that the mechanical or civil engineer should abandon his special profession and take up electrical work, for the number of electrical engineers promises to increase faster than the demand for their services. It requires no great foresight to see, however, that with the constantly increasing part which electricity is playing in modern industry, the engineer who aspires to high rank in his profession ought to be familiar with the possibilities and limitations of electrical work. He should be able to judge for himself in cases where the relative advantages of electric and other motive power must be decided, not relying solely on the representations of possibly biased experts. The civil engineer asked to report on the value of a water power, the mining engineer giving an opinion on the cost of working a mine in a remote mountain district, the mechanical engineer planning the machinery of an extensive shop, all need to know what can be done with electricity in order to reach an intelligent decision.

UTILITIES OF SWITZERLAND'S WATER COURSES.—All the celebrated water courses of Switzerland are, one after another, being utilized for a force of energy. The river Aar is taken like the others. The canton of Berne has given a concession to Mr. Muller Landmann for the use of a waterfall at Wynau, aided by a canal 1000 metres in length, which gives a fall of 100 cubic metres per second, falling nearly four metres. The turbines will be constructed for a force of 3000 horse power destined for the industrial districts of central Switzerland and for the exploitation of an electric line. This force is only one-half greater than that given by the artificial falls of the Seine, up and down stream from Paris, at Port a l'Anglais and at Suresnes. We believe it will soon be used in valley. In that case we carry to the turbines 6000 horse power, which can easily be done, as the concession permits a fall of eight metres.—Translated for The Industrial World from *Electricite*, Paris.

HIGH-SPEED INTER-URBAN RAILWAYS.—C. Zipernowski, before the Electrical Congress, Frankfurt, proposes a line between Vienna and Buda-Pesth, a distance of 250 kilometres—say, 150 miles—and a speed of 150 miles per hour, which he considers the maximum the wheels will stand without danger of flying to pieces. The trains would consist of one carriage, seating forty passengers, carried on two bogies, with solid steel wheels eight feet in diameter, the driving power being four 200 horse-power motors, working at 1000 volts, which necessitates collecting, therefore, by contact from a center raised rail, some 600 amperes. The up and down lines must be about ten metres apart, to avoid the shock of air, when two

carriages pass, blowing them off the rails. There must be no curves of less radius than 3000 metres—say, 1.8 miles—and for these the outer rail must be raised fifteen centimetres (six inches). The power would be supplied from two stations, at 10,000 volts alternating, which would either be transformed down or redressed to direct current, at 1000 volts.

USEFUL INFORMATION.

PERSONAL SAFETY.—Francis B. Crocker and A. S. Wheeler are writing a series of articles (published in the *Electrical Engineer*) on "The Practical Management of Dynamos and Motors." On the subject of personal safety, they say: "Never close a circuit through the body. An accidental contact may be made through the feet, hands, knees, or other part of the body in some peculiar and unexpected manner. For example, men have been killed because they were sitting on a conducting body. Rubber gloves or rubber shoes, or both, should be used in handling circuits over 500 volts. The safest plan is not to touch any conductor while the current is on, and it should be remembered that the current may be present when not expected, due to an accidental contact with some other wire or a change of connections. Tools with insulated handles or a dry stick of wood should be used instead of the bare hand. The rule to use *only one hand* when handling dangerous electrical conductors or apparatus is a very good one, because it avoids the chance, which is very great, of making contacts with both hands and getting the full current right through the body. This rule is often made still more definite by saying, 'Keep one hand in the pocket,' in order to make sure not to use it. The above precautions are often totally disregarded, particularly by those who have become careless by familiarity with dangerous currents. The result of this has been that almost all the persons accidentally killed by electricity have been experienced electric linemen or station men."

FLOOR CONSTRUCTION.—It seems that Herr Wulff, the inspector of buildings in Hamburg, Germany, says the *Manufacturers Gazette*, has recently taken considerable interest in the matter of floor construction, and some experiments made by him have a tendency to demonstrate that the various materials introduced between, with a view to increasing their resistance against fire, are practically useless, and that the foul smoke caused by their burning may be injurious. He prepared 11 pieces of flooring, each about five feet square, which were successfully placed on four posts, under an iron roof, and covered with inflammable materials. These materials were then ignited and kept burning until the sample floor was burned through. As the result of these experiments it was ascertained that a floor of two thicknesses of 1.5-inch boards joined at right angles was burned through in one hour and 22 minutes. The same construction with asbestos paper between the flooring burned in 59 minutes, and with the ordinary roofing felt the flooring burned in one hour and 12 minutes.

ASBESTOS CEMENT.—A factory for the manufacture of King's Asbestos Windsor cement has recently been established at Savannah, Ga., that will confine its operations to the higher grades required for plastering walls and ceilings. It is a dry mortar finish and is beautiful in appearance. It is elastic, and consequently does not crack like the ordinary lime plaster. Asbestos is fire-proof, as everybody knows; this is another advantage of this excellent plaster. It is also proof against vermin and germs of every nature. It contains no acid and does not discolor. Frequent tests have demonstrated the fact that walls plastered with this cement will not fall, a guarantee of satisfaction to every landlord. The factory will have a capacity of thirty tons daily, and is controlled by A. Hanley.—*Savannah News*.

SUBSTITUTE FOR A SPLIT-PIN.—An interesting device to be used as a substitute for a split-pin is described in *Invention* (London). Instead of boring a hole through the end of a bolt for the insertion of a split-pin to hold the bolt in place, an annular recess is turned in the bolt, the inner shoulder of which is flush with the surface of the piece through which the bolt is inserted. A conical ring, with a spring temper, cut through on one side, is then slipped over the protruding end of the bolt into the recess until it snaps into the recess, the base of the ring resting against the surface of the piece through which the bolt is inserted and outside of the diameter of the bolt. The drawings accompanying the

description referred to show that a very neat finish may be made in this way, and it seems a highly practical method of fastening bolts or locking nuts in place.

THE WATCH AS A COMPASS.—It may not be known to many, says *Iron*, that the points of the compass can be determined with the aid of an ordinary watch. It is simply necessary to bring the watch in a position so that the hour hand is directed toward the sun. The south then lies exactly midway between whatever hour it may happen to be and the numeral XII on the dial. Let us suppose, for instance, that it is four o'clock, and that the timepiece is held in the position indicated. The direction of the numeral II will then be the exact south. If it be eight o'clock, the numeral X will indicate the exact southerly point.

STRENGTH OF STRONG MEN.—A French experimenter has tested the strength of 50 robust men and 50 healthy women, all of the middle class of society and between 25 and 45 years of age. The strongest man was able to give with the right hand a pressure equivalent to 187 pounds, and to the weakest one of 88 pounds. The short men were nearly as strong as the tall, the average difference being less than seven pounds. The force exerted by the strongest woman was only 97 pounds, and that by the weakest was but 35 pounds, while the average was 72 pounds.

GOOD MEALTH.

OVEREATING VS. OVERWORK.—An abuse that tends to the injury of brain workers is excessive eating. I recall to mind several active brain workers who suddenly broke down, and fancied that it was due to brain fatigue, when, as a matter of fact, it was due to overstuffing of their stomachs. The furnace connected with mental machinery became clogged up with ashes and carbon in various shapes and forms, and as a result disease came, and before the cases were fully appreciated, a demoralized condition of the nervous system was manifested, and they laid the flattering unction to their souls that they had indulged in mental overwork. Hard work, mental or physical, rarely ever kills. If a mild amount of physical exercise be taken, and a judicious amount of food be furnished, the bowels kept open in the proper manner, the surface protected with proper clothing, and the individual cultivates a philosophical nature and absolutely resolves to permit nothing to annoy or fret him, the chances are that he can do an almost unlimited amount of work for an indefinite length of time, bearing in mind always that when weariness comes, he must rest, and not take stimulants and work upon false capital. The tired, worn-out slave should not be scourged to additional labor. Under such stimulus, the slave may do the task, but he soon becomes crippled and unfit for work. The secret of successful work lies in the direction of selecting good, nutritious, digestible food, taken in proper quantities, the adopting of regular methods of work, the rule of resting when pronounced fatigue presents itself, determining absolutely not to permit friction, worry, or fretting to enter into his life, and the cultivation of the Christian graces, charity, patience, and philosophy.—*Medical Mirror*.

CAN DISEASES BE COMMUNICATED BY THE TELEPHONE?—The danger of a possible communication of infectious diseases by the medium of the telephone has recently been exercising the minds of the postal authorities in the Pomeranian city of Danzig, who ordered a scientific investigation of the subject. The results of the inquiry have now been officially made public, and they are, on the whole, of a reassuring nature. The exhaled air which comes in contact with the instrument every time it is used is proved to be germ-free. Should, therefore, any particles, which may be on the telephone plate, be communicated to persons using the telephone, this cannot occur through the simple breathing of air, but only under certain conditions; namely, if particles ejected by diseased, especially consumptive, persons alight by chance on the microphone and there dry in. But even this contingency is easily obviated, if the settlement of dust in the apparatus be prevented by frequent wiping with a damp cloth. The risk of taking disease by infection through the use of the telephone must then be regarded as very slight, especially as we have it on scientific authority, that it has never actually been established that where a person who was in the habit of using the instrument had contracted a contagious disease, this was communicated by the medium of the telephone.



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SAN FRANCISCO:
 SATURDAY, APRIL 2, 1892.

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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Wire, Wire Rope, Etc.—California Wire Works.
 Concentrators—Geo. E. Woodbury
 Hand Rock Crushers—John Taylor & Co.
 Situation Wanted—J. C. Beard, Lancashire, England.
 Situation Wanted—L. A.
 Dividend Notice—Pacific Coast Borax Co.
 See Advertising Columns.

The Miners Need Funds.

The California Miners' Association is anxious to keep its delegates at Washington until some final action by Congress regarding the Debris bill. In the time they have been there they have accomplished a great deal, but more remains to be done. A favorable report from the Mining Committee has been made on the bill appropriating \$450,000 for the construction of debris dams, which is a very encouraging thing. But for the presence of the miners' delegation, and their energetic work, this would not have been accomplished. Having gained this point of vantage, the committee has now turned to impressing the members of the House and Senate with the justice and reasonableness of the State's demand. In order that the necessary missionary work may be done before the question comes up for debate, in order that the arguments of our representatives in Congress may fall upon ears ready and willing to listen—in short, in order that all that has been thus far accomplished shall not be lost, and that some practical relief may be obtained at this session of Congress, the continued presence of this committee at Washington for some time longer is an absolute necessity.

The expenses of the committee of gentle-

men engaged in a work of this magnitude must necessarily be considerable. While some of the counties most directly affected by the proposed legislation have responded liberally in the matter of furnishing funds, the merchants of San Francisco, who are affected in only a less degree than the miners and farmers themselves, have been lukewarm. This has been due, not to a want of good-will, but to lack of advice as to what has been accomplished and as to the necessity of liberal contributions in order to push to a successful termination the fight still before us.

An appeal has been made to the merchants of San Francisco by the Miners' Association in which the above ideas are embodied. They are asked to contribute as liberally as possible, and the miners promise to publish an itemized account of the expenditure of the money so contributed, so that it will be seen that none is wasted.

It is to be hoped that a prompt response will be made to this appeal, and that the merchants of San Francisco will lend the necessary pecuniary aid to the movement. The funds of the Miners' Association are low, and it is undesirable to recall even one of the delegates at Congress. This city will benefit largely by a resumption of hydraulic mining on the basis proposed, and its citizens can afford to extend liberal help to those who bring the result about.

The Present Price and Future Status of Silver.

What was long since foreseen has at length come to pass. The warfare commenced in this country on silver is beginning now to yield its legitimate fruits. Exhausted by the protracted struggle to keep their works going, many of the larger producers of the white metal on this coast are yielding to the inevitable and retiring from the business. One after another our big silver mines are being closed down. Commencing only a few weeks since, nearly a dozen of the leading companies have already suspended operations. Many of the large concerns at Butte, Montana, have put out their fires, hung up their stamps, and ceased ore extraction. And now comes the news that the Waterloo Company at Daggett, in the Calico district, and the largest silver producer in this State, has in like manner suspended operations, with the probability that other companies in that vicinity will shortly follow suit. The Aspen Cons. mine, at Aspen, Colo., and several other silver mines at Telluride, also closed this week, throwing 1000 men out of work.

And thus there has been made a good beginning of what threatens to become a widespread suspension of silver mining throughout the regions lying adjacent to and west of the Rocky mountains, whence comes more than two-thirds of the entire silver product of the world.

And what, should it happen, does the occurrence of such an event mean? Have our legislators, publicists and financiers any just conception of what it implies, or have they ever stopped to contemplate the subject in this new light? First, there is to be considered the thousands and tens of thousands of working men that, should this industry be stopped or largely intermitted, will be thrown out of employment, and this under circumstances of peculiar hardship. The business of silver mining is carried on for the most part in remote and barren sections of country, where, apart from this, there are no other large industries to give employment to labor. Deprived of work in these far-off places, these men, many of whom have families to support, will be rendered utterly helpless, being without opportunity to earn a living where they are or means to take them to localities where they can do so. The distress that must ensue from this condition of things can be more easily imagined than described.

Next, there is to be considered the loss of capital that a general cessation of silver

mining will involve. What this would amount to is simply incalculable, the sum invested in this business reaching far into the hundreds of millions. Not only will this large sum cease to make earnings, but the owners of these mines, unless their total abandonment is contemplated, will have to pay out money continually to keep them in repair. The underground works, if suffered to fill with water, will soon become irretrievably ruined, and the entire plant, if neglected, hasten to decay.

How imminent is the danger of a general shutting down of our silver mines becomes apparent when we reflect that the companies which have already done so were every one of them well situated for continuing the business, which they no doubt would have done could it have been continued with profit, or even without a positive loss. The mines about Butte which carry large bodies of fair-grade ore, are well developed and outfitted. Water and timber are abundant in the neighborhood, while railroads lead into the district from every quarter, the conditions prevailing at the Waterloo mines, in this State, all things considered, being no less favorable.

Intervening between the Calico and the Butte districts are portions of Idaho, Utah and Nevada, all large silver-producing countries. That we shall, before long, hear of companies there, following the example of their neighbors on both the north and the south, may well be expected.

In a conversation just had with Simeon Wenhan, probably the largest individual producer of silver in the world, he expressed the belief that such result was sure to happen, remarking that he would have closed his mines in the Cortez district, State of Nevada, some months ago but for his unwillingness to throw the large number of men in his service there out of employment.

These Cortez mines have to date turned out silver values aggregating over six million dollars, their present yield amounting to \$600,000 per year. While there exists here no special need for economizing the ore, so large is the stock already developed or presumably in store, still the owner of this property feels that he is committing a sort of waste in working on a profit-margin so comparatively small. Yet he prefers suffering such constructive loss to shutting down his mines and thereby casting these poor people adrift on the desert, few of them able to long subsist on their accumulated earnings and none knowing where to go, with any certainty of getting employment.

Not always, however, are the producers of silver actuated by such humane motive, or if they are, few of them can afford to gratify the same at the expense of their pockets. In most cases, therefore, where the business shall cease to prove remunerative, its early abandonment must be looked for.

Few men have studied this silver problem with greater care or by more intelligent methods than the owner of these Cortez mines, his deep interest in this question having compelled him to look into and carefully consider it in all its aspects and bearings. When, therefore, he expresses the opinion that our Government might, with safety, adopt the free coinage of silver, and that it should at once proceed to do so, such opinion is entitled to respectful consideration, to say the least.

Simeon Wenhan, though a native of England, whence he came to the United States in early boyhood, is enough of an American to believe that in dealing with this silver question, as well as with many others of national import, this country can afford to disregard the conditions and usages that obtain in the Old World, and in all things adopt such policy as our best interests may seem to dictate.

Making frequent visits to his early home, some of which are extended to Continental Europe, Wenhan is conversant not only

with the monetary systems in vogue there but also with the commanding influence everywhere exerted by the United States in these and, indeed, in matters of almost every kind. In affairs social, fiscal and industrial, the greatest respect is had for examples set them on this side, and should our Government lead off on this free coinage question, it would not be long till we would have all Europe for a following.

The fear of any hurtful influx of silver as likely to result from the adoption by us of such measure is, by our informant, considered altogether chimerical, for the reason that these peoples abroad would need to retain all the silver they have for home use, and this whether they remonetized the white metal or not. Not only so, but they would have to draw largely from us to keep up their stock, as they produce very little silver themselves. As to dumping their silver on our mints, and with the proceeds buying gold and shipping it away, that, too, is a delusion. Should this be attempted, depositors would get in return for their bullion only silver coin or silver certificates, which in buying gold could only be used at the current discount. And thus, while our mints would get their seigniorage for coining this silver, the depositors would gain no advantage, to say nothing of the costs incident to shipping it across the ocean. So confident is Mr. Wenhan that Congress will rehabilitate the white metal, and thus cause it to appreciate in value, that he has not for the past four months sold an ounce of silver, holding the entire output of his mines for such expected improvement in the market.

But speculate and argue as we may, one thing is certain: This silver business has reached a stage that calls for vigorous and determinate action. The day for temporizing is past, nor will it do to dilly-dally any longer. With our great silver mines closing down, and this entire interest threatened with a deadly peril something positive will have to be done, and that speedily. If we cannot arrest this degradation of silver, let it be relegated to the domain of the base metals and have done with it. If no plan can be devised whereby its full money function can be restored to it, and afterward maintained, then let it be proclaimed a mere commodity to be sold like lead, copper and iron for what it is worth on the markets of the world. This done, and its status will be so fixed hereafter that all will know what to expect and how to regard it.

The doctrine lately announced by Leland Stanford in the United States Senate, that every dollar issued by this Government, whether gold, silver or paper, should be maintained at a parity, is the right one. No form of money bearing the stamp of this Government should be discredited, least of all by any Act of the Government itself. Let us try the free coinage of silver and see what it will do toward the accomplishment of that end. This policy worked well in the past, and there can be no good reason why it would not work well again. Never before the white metal was so devalued did its price drop as low as that ruling at present, nor was a gold dollar ever then worth any more than one made of silver, the disparity now existing between them being wholly due to the demonetization of the latter.

Never since that stupendous blunder was committed were conditions more favorable than now for adopting measures looking to its correction. The times are auspicious for a movement of that kind. The whole financial world is alive to the importance of this silver question. When last year Commissioner Seligman, sent by our Government to Europe to consult with the moneyed magnates there on the subject of convening an International Congress for the purpose of establishing by general consent the relative value of gold and silver, and, further, to gather their views in regard to restoring silver to its former standing in the monometallic nations of Europe, our commissioner was not only well received, but found the most of these people ready to further, by all means in their power, the objects of his visit. There prevails, in fact, among the manufacturers, merchants and business men of the Old World a strong sentiment in favor of bimetalism, the opposition to this policy being confined largely to theorists and money lenders. The recent utterances of Mr. Goschen, the English Obancellor of the Exchequer, sufficiently denote how widespread this sentiment has become in both the financial and the Government circles of Great Britain.

Sorting and Handling Coal.

In last week's PRESS, a sectional-view was given of the Iron Breaker at Drifton, and this week, a view is presented showing the end elevation of the breaker, jig-house and pockets. This structure is a somewhat remarkable one, owing to the care given to the general features as well as to the details of construction and operation. As an adjunct to a large coal mine, intended to prepare the coals for the market, these details are of interest to coal miners. Some of the apparatus is used simply for changing the

Where an abrupt change in the direction of the chute becomes necessary, we often use cast iron turns, which are spiral, half-round troughs of greater or less length. One large one of this kind, *D*₁ (see engraving) is used for carrying the lump coal from the platform *F* to the lump coal chute. It is a spiral, the center of which is always 16 feet from a vertical axis. The chute is 4 feet wide inside and the section is half an ellipse. The slate conveyor *N* carries away all the refuse that does not float off with the water. There is a double drag *M*₂ that carries the screenings from the loading lips

The end elevation of the breaker, with jig-house and pockets, is shown in the cut. The numbered parts (which correspond with those shown in the cut in last week's PRESS), are as follows:

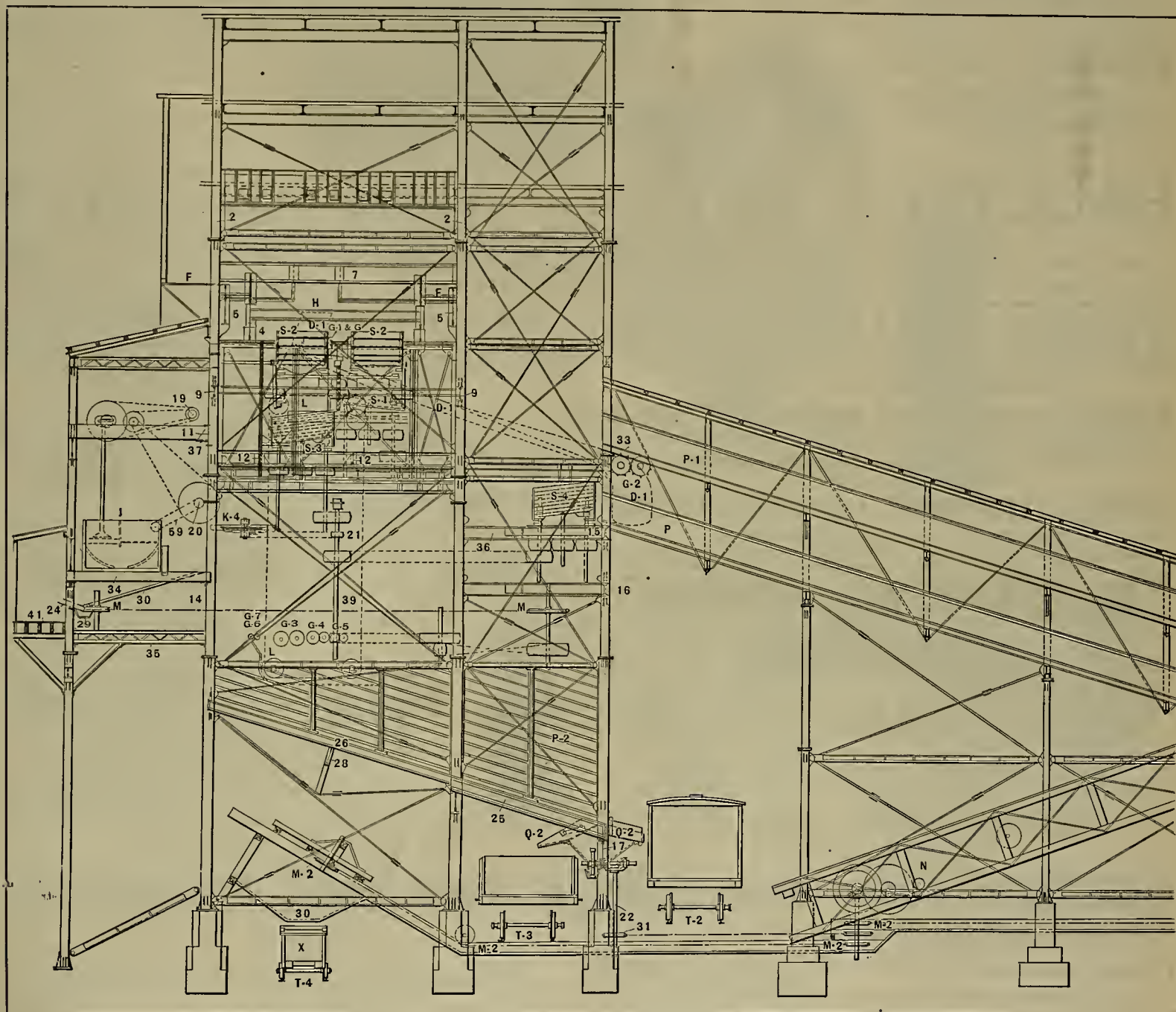
The side elevation of the breaker is shown in the plate. The numbered parts are as follows: 2, built up I-beam carrying dump; 4, taper built-up girder, forming sides of mud-screen pocket *H*, and carrying dump chute and bars; 5, built-up I-beam carrying platform *F*; 7, inside girder carrying sheaves; 9, fifteen-inch I-beam carrying mud-screen *S*₁; 11, 24-inch I-beam carrying

drainings, slate and slimes; 39, vertical line shaft; 41, platform for slate drawer; 59, scraper chain of jigged coal.

The Astronomical Society.

The Astronomical Society of the Pacific held its annual meeting on Saturday evening last, when a large number of members were elected.

A new board of directors was elected, as follows: William Alvord, Charles B. Hill, W. W. Campbell, Otto von Guldern, E. S. Holden, Camilo Martin, E. J. Molera, Wil-



END ELEVATION OF BREAKER, JIG-HOUSE AND POCKETS, SHOWING DETAILS OF CHUTES, ETC.

position of the coal without making any mention of its preparation. It consists of chutes, elevators, drags and loading lips. The chutes are used for conveying the coal or slate from one portion of the breaker to another, the stuff sliding down by gravity. In this breaker they are constructed, as a rule, of sheet-iron, and are generally half-round troughs; the size, inclination and thickness of the iron depending upon the work to be performed; the larger the coal the heavier the iron, and the smaller the coal the lighter the iron and the greater the pitch of the chute. Some of the chutes are flat instead of half-round, and are formed of sheets of steel plate, with steel sides. These are generally used where it is important to inspect the coal. There are a number of local causes that may cause a round or square chute to be preferred in special cases.

into a car *X* under the breaker, which is hoisted to the top of the breaker.

The pockets for the prepared sizes of coal are eight in number. They are 38½ feet long, 11½ feet wide, 3½ feet deep at the upper end and 15½ feet deep at the lower end. The bottoms of these pockets, which are made of cast iron plates, are supported on beams (25 and 26) running parallel to the longer axis of the pocket, and on a pitch of four inches to the foot. They are supported at four points by iron beams, three of which are between posts, and the fourth (28), running the whole length of the pockets, supported by a truss as shown. The lump coal chute *P* consists of a pin-connected truss structure, with two chutes, the upper one *P*₁ for steamboat coal, and the lower one *P*₂ for lump coal. The general construction is shown in the cut. Loading chutes are arranged at the bottom.

driving mechanism of jigs, also screens *S* and *S*₁; 12, fifteen-inch I-beam carrying timbers under wet-screen; 14, twenty-four-inch I-beam carrying east end of jig tanks; 15, I-beam carrying broken-coal screens *S*₂; 16, fifteen-inch I-beam; 17, twenty-four-inch built-up I-beam under deep end of pockets; 18, eight-foot sheaves nearest to hoisting engines, north side; 19, line shaft from Westinghouse engine for driving jigs; 20, line shaft for driving drags taking coal from jigs; 21, pulley from which gyrating separator *K*₁ is driven; 24, slate chute under jigs; 25, built up I beam under pockets; 26, rolled beam at shallow end of pockets; 28, built up beam under 26; 29, slate drag trough under jigs; 30, screenings-hopper above *T*₁; 33, trap door over steamboat rolls, *G*₂; 34, twelve-inch timber carrying jig tanks; 35, lattice-girder for jig-house; 36, beam carrying *S*₂; 38, chute floor for jig

liam M. Pierson, J. M. Schaeherle, Frank Soule, F. R. Ziel.

Publication Committee.—W. W. Campbell, E. S. Holden, Charles G. Yale of the MINING AND SCIENTIFIC PRESS.

After election the board went into executive session, which resulted in the choice of the following-named officers for the usual term of one year:

J. M. Schaeherle, president; E. J. Molers, first vice-president; Frank Soule, second vice-president; Otto von Guldern, third vice-president; F. R. Ziel, secretary and treasurer.

Steps are to be taken to build an observatory in this city. Andrew Carnegie of Pittsburgh, who has been elected a life-member of the society, will give material financial aid in this direction, and a committee is to solicit subscriptions toward putting up a first-class observatory.

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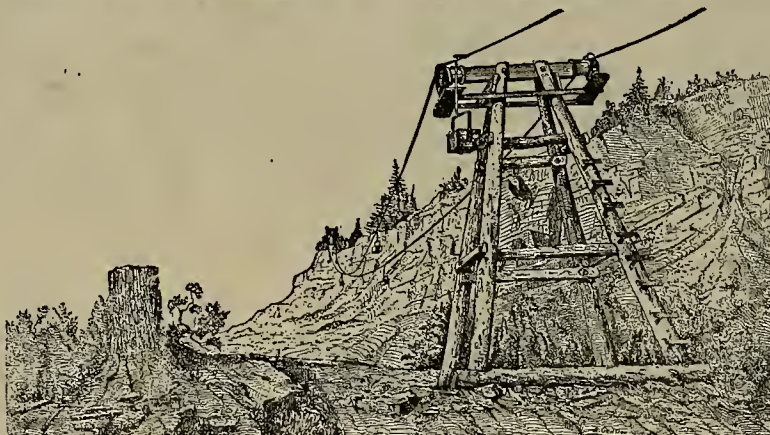
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List of U. S. Patents for Pacific Coast Inventors.

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TEN WEEK ENDING MARCH 22, 1892.

- 471,508.—PAPER WEIGHT.—Chas. Dickinson, Portland, Or.
 471,325.—CASH AND PACKAGE CARRIER.—Julius Finck, S. F.
 471,477.—GUN-CLEANING DEVICE.—Geo. H. Garrison, Kent, Wash.
 471,335.—VALVE GEAR.—Heintzelman & Noyes, Sacramento, Cal.
 471,326.—INSERTIBLE SAW BIT.—M. A. Howe, S. F.
 471,327.—BAR FIXTURE.—Lefebvre & Cessna, Redding, Cal.
 471,483.—POCKET SAVINGS BANK.—L. U. Loomis, Tacoma, Wash.
 471,487.—HONEY EXTRACTOR.—C. W. Melcalf, Santa Paula, Cal.
 471,131.—CURRN.—Rebecca E. Miles, Porterville, Cal.
 471,222.—ATTACHMENT FOR RANGES.—John F. Myers, S. F.
 471,359.—CHECK ON ORDER BOOK.—Edward North, Newhall, Cal.
 471,258.—ORE CONCENTRATOR.—J. M. Thompson, S. F.
 471,319.—CONCENTRATOR.—Jas. Tulloch, Angels, Cal.

The following brief list by telegraph, for March 29 will appear more complete on receipt of mail advices.

- California.—James A. Christy and E. J. Baldwin, San Francisco, telephone receiver; Milton A. Clemen, San Francisco, connecting rod, joint and bearing; William B. Flynn, San Francisco, car brake; James B. Freeman, Los Angeles, machine for separating gold, silver, etc.; James Gallagher, Oakland, electric light crane; George L. Goodman, San Francisco, prescription file; Edward E. Park, San Francisco, dental disk holder; Mark A. Penny, Perry's, brake shoe; George A. Richardson, Latrobe, level square; Luther H. Steffy, San Diego, adjustable head section for beds; Gerhard L. Thunen, Oroville, safety attachment for gas burners; Ada H. Vanpelt, Oakland, house-door letter box; Charles A. Warren, San Francisco, excavator; California Automatic Interchangeable Car-Coupling Co., car-coupling; James B. Williams, Oakland, insulated electric conductor (2); Ozzie H. Burnham, Oakland, and J. J. Meyers, San Francisco, refrigerator; Oregon.—Dan C. Turner, Roseburg, plow; Washington.—Isaac Burlington, Fremont, indicator for sawmill cuttings; Austin E. Miller, Sprague, tri-cycle; William B. Morris, Seattle, stump puller; Andrew Wren, Seattle, snatch block.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraph order. American and Foreign patents obtained, and general patent business for Pacific Coast Inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

BAR FIXTURE.—J. J. Lefebvre and J. O. Cessna, Redding, Shasta Co. No. 471,327. Dated March 22, 1892. The object of this invention is to provide a bar fixture for keeping cool conveniently, holding and permitting the ready manipulation and cleaning of the several bottles, vessels, pipes, etc., in which the liquids are contained. This whole device is intended to be located under the counter of the bar and is therefore in convenient position. From certain cocks and faucets the barkeeper can draw cold water or cold beer. He can reach his several bottles conveniently, and their contents are kept cool by the cold air in the cooling box. His drip-sinks, drip-racks and rinse-sinks are all conveniently located and have proper discharges, and all parts are adapted to be readily removed and replaced.

INSERTIBLE SAW BIT.—Merrill A. Howe, S. F. No. 471,326. Dated March 22, 1892. This consists of a bit, the holding extension of which and the segment by which it is engaged and held are fitted into the throat of the tooth opening in the saw plate upon the arcs of two intersecting circles, and in conjunction with this of certain holding-lugs whereby the bit and the segment are prevented from shifting their positions.

CASH AND PACKAGE CARRIER.—Julius Finck, S. F. No. 471,325. Dated March 22, 1892. This invention relates to that class of cash and package carriers for store service in which a basket is suspended from a car mounted upon an overhead track and adapted to be propelled by separating the track wire. In this class of devices, when the basket or receptacle is attached and lowered from the car, it often happens that by mistake a salesman, before said basket is again attached, will pull upon the lever whereby the track is raised, and will thereby start the car off without the basket. The object of this invention is to prevent this by providing an automatic locking attachment which will retain the car in place when the basket is detached by preventing the lever from raising the track, and will allow the lever to act again only when the basket is attached to the car.

BACK FILES OF THE MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.

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California Mineral Lands.

MURPHYS, Cal., March 23, 1892.

TO THE EDITOR:—In an article by Mr. A. B. Paul which appeared in the MINING AND SCIENTIFIC PRESS recently, that gentleman claimed that the Miners' Association had neglected the quartz miner in its zeal to serve the hydraulic. I presume the majority of your readers agreed with you in your reply that Mr. Paul was simply mistaken, but I know that the Association has a still larger contract on its hands if it would give the quartz miner the same measure of assistance that is now being so liberally and effectually put forth in behalf of the long-suffering and persecuted hydraulic miner. Mr. Field has lately stated how he will rule in regard to mineral lands claimed by the railroad companies, and these same companies have shown their belief in his ability and willingness to so decide, by sending their agents throughout every mineral-bearing section traversed by their lines to rate these lands; and it is this well-known fact that has caused Mr. Paul and every miner in those sections to feel that unless prompt and decisive action is taken the miner will be compelled to either rebuy his lands from the railroad companies at the values which he has made by his own labor and expense, or see his property wrested from him. Now, if ever, is the time to strike and to strike so effectually that the (in)justice of 100 Fields cannot undo it. Another matter that could be pushed to advantage at the present time is to imitate the example of the Colorado representative, who has introduced a bill to the effect that all monies derived from the sale of mineral lands in Colorado shall be paid to and for the Colorado State Mining College. Colorado has ever looked after her mineral interests and though young in years is fast advancing to the front. We of California have asked, What for our mines? Nothing! The oldest and greatest mining State in the Union and she has no mining college, and begrudges the yearly allowance to her State Mining Bureau. Let us, too, have a mining college, and in the interval pay the money from the sales of mineral lands over to our State Mining Bureau. Colorado will assist, and every other mining State, in the passage of the bill, and now that the mining interests have, at last, a representative in Congress in Mr. Caminetti, who knows what we want, and knowing it, does not hesitate to ask nor fail to work for it, there would not be that indifference, if not opposition, that has met every measure introduced for the benefit of the miners in the past.

E. H. SCHAEFFLE.

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 Any stock upon which this assessment shall remain unpaid on the 15th day of April, 1892, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 9th day of May, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.
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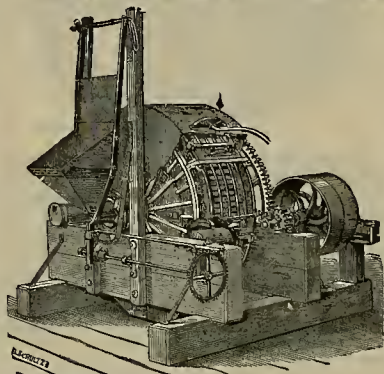
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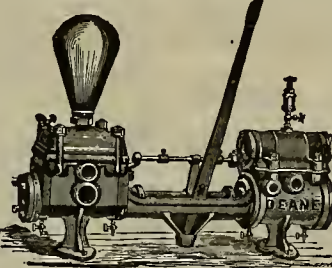
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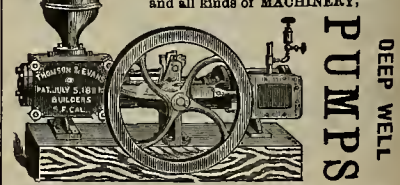
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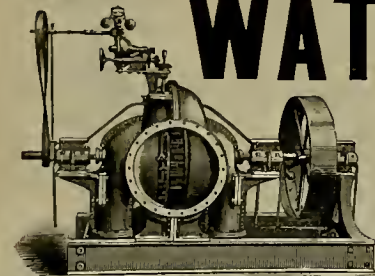
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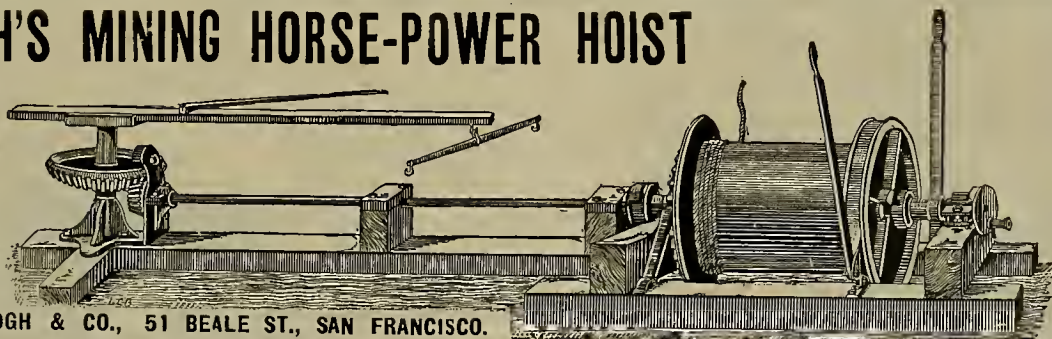
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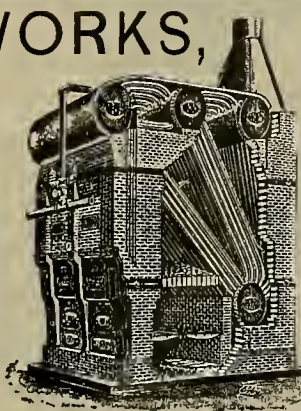
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 31, 1892.

Rains the past week in the valleys and snow on the mountain ranges were welcomed by the trade in general as emphasizing the encouraging outlook for a prosperous season. If Congress would encourage hydraulic mining in this State and still further protect the silver mining industry, all agree that this year would be the most prosperous in the history of the State. Iron workers are outspoken in this belief. The local money market continues easy, as do Eastern money markets. European money centers are reported more or less feverish, with time only able to restore confidence. Referring to the general situation the *Chicago Drovers' Journal* editorial says that these two opposite agencies of influences are beginning to be felt in the business world, one working in the direction of higher prices and heavier demand, and the other in the direction of lower prices and a continuation of restricted dealings. The cause for the first agency is the natural growth of business; the cause for the second is the restricted facilities for doing business. At no time has there been as much curbed enterprise as to-day. In every department of activity there are schemes and projects by the score waiting the right time to be sprung. There is a conviction in the minds of a great many shrewd business men that there is an insufficient supply of money to float more than a very small percentage of these new enterprises. The expanding demand which is being felt can be very quickly supplied, not from stocks in hand, as stocks are light, but from current production which is at its maximum point in many directions.

Eastern advices report a decided falling off in exports, owing to a fall in the price of breadstuffs abroad. Referring to the lessened outward movement, the *New York Mail and Express* says: "The export movement culminated in December, when the total of \$19,935,896 was reached, and for three months in succession the best record was broken. The total for January was \$100,381,336, which was large enough, and for February \$86,638,097. This is quite a falling off as compared with previous months, but it is almost twelve millions in excess of the total for the same month last year, which was then the largest on record, for the month. For the 12 months the total runs only \$220,229 short of around \$1,000,000,000."

QUICKSILVER—Receipts the past week aggregate 200 flasks. The market is dull but steady.

MEXICAN DOLLARS—The market is stagnant at around 68 cts. Dealers do not appear to have much faith in silver recovering much of the decline made the past week.

SILVER—On last Monday the Eastern and foreign markets made quite a bad break, sending prices to lower figures than known in the history of trade. The break is accepted by those in position to know, to be due entirely to manipulation, and by them it is claimed that the markets do not appear to have settled for another sharp decline is liable to set in before long. Silver, as a commodity, offers a fine gamble to large moneyed pools. Not only can silver be successfully manipulated but securities having their market value hinged largely on the market price of silver, can also be advantageously dealt in. Who the prime movers in the present manipulation of silver are, outside of those given in last week's *PRESS*, we do not know, neither do we claim to know how it is to be manipulated, yet the market has the earmarks of a rapid recovery and good prices after the syndicate or pool have accomplished their object on the down move. The stock of silver bullion at the East is given at a little over 3,000,000 ounces, and as the production is largely curtailed the Mint purchasers will soon absorb the available stock. Besides this, England will be a large buyer before 60 days pass, for that country has been slow in settling with India, and the result is that on March 15th the silver balance was \$1,500,000 in favor of India as compared with an adverse balance nine months ago of \$7,000,000, and the balance this year in favor of India is steadily increasing under heavy exports by the latter.

BORAX—Receipts the past week aggregate 448 cts. The market is fairly steady.

LIME—Receipts the past week aggregate 8742 bbls. The receipts come chiefly by water. The Hawaiian Islands continue to be large purchasers. The home demand is quite free.

ANTIMONY—The market is steadier, in sympathy with the East. New York mail advices quote as follows: 10% @ 11c for Hallett's; 12% @ 14c for LX; and 14% @ 15c for Cook's, in wholesale quantities.

LEAD—The market is in buyers' favor. At the East, sales are reported of 1500 tons at around 4.10 cts. Since then, the price was advanced to 4.15 cts.

TIN—Pig is scarce and higher. Plates are unchanged. Canners are using up large quantities, but they supplied their wants some time ago. London cables report plates easier under an offish demand.

PIG IRON—The market is essentially unchanged. While the foundries and iron workers in general report fair degree of activity in their lines, yet they claim that it would be largely increased if the Government would aid hydraulic mining. London cables report a higher market. Eastern mail advices report a slightly better tone, yet no advance is looked for, owing to the heavy output and the low cost at which Southern can be turned out.

COPPER—The market is fairly steady. While there is a general belief that a combine has been organized at the East and abroad, yet no particulars can be secured. London cables to the *Iron Age*, March 24th, report as follows: "The copper market has been excited and strong, and prices have advanced about 1/2. Various rumors regarding the alleged producers' combine have kept a lively interest in the market, and strong American advices have also tended to stimulate speculation, while the reduction of over 1438 tons in European stocks during the first half of the month has tended to increase confidence. Consumptive demand improved considerably during the past week, particularly for electrical supplies. Another block of 7000 tons Anaconda matte has been sold for delivery over five

months, price to be regulated by selling price of merchant bars in the London market."

COKE—The market is lower under heavy spot supplies. After these are cared for, better prices are looked for.

COAL—Imports the past week aggregate as follows: Tacoma 8200 tons, Seattle 2018, Departure Bay 1435, Nanaimo 7312, Baltimore 4250; total 23,215 tons. The market does not present any material change for either spot, to arrive or for shipment. The consumption is fair, with the outlook favorable for a large increased demand to set in next May.

Mining Share Market.

SAN FRANCISCO, March 31, 1892.

The market has been featureless the past week, with fluctuations not wide enough to allow even that king of choppers, Lipman, to make a profitable turn. While the action of the market is an enigma to the many, yet it strengthens the conviction among a few shrewd operators that a sharp up-move is near at hand, and that while prices may shade off slightly first, still those who have stocks and are quick about it can sell at a good profit when the advance comes. The up-move will quite likely be like the jumps since the month of May in 1891, made to make the small shorts fill and not of long enough duration to let outsiders unload on the manipulators. It is an undeniable fact that stocks are scarce among commission brokers, for the majority of buyers pay cash; but this very fact is accepted as *prima facie* evidence that the stock pool is playing for a sharp upheaval. All previous deals have been made with large lines of stocks held by brokers so as to induce shorting, and it is only on the shorts that a successful deal can be made these days when insiders get the bullion and outsiders get left with assessments. By making stocks scarce, it is evidently the intention to induce outsiders to buy with the expectation of a deal being near at hand. Bullion and assessments are good enough for a while, but the market is making the making active and higher prices for mining shares. If brokers work more in harmony, then the rings will have their rearranged little game spoiled and he forced into the market as buyers so as to control the mines at their respective annual election. The Brokers' Combine forced the reported rings to contest for the control of three mines this year, and consequently higher prices were obtained for shares, but after securing the mines, then the market fell back into its old rut. Within the next three months, several mining companies will hold annual elections; and if sell out brokers and brokers who worship the "golden calf" will lay low and neither say nor do anything, we may witness better times than have been seen for many years.

It looks very much as if some person or persons are trying to buy the San Francisco Stock Exchange building at a low figure, and to facilitate the sale they bring influences to bear on certain brokers to give their proxies for shares in their name to reported insiders to secure control of the mines. Why don't the brokers try a change? The market certainly cannot be made any worse.

It looks very much as if Sam Jones' extra effort in repitting the finding of ore in several of the Gold Hill mines made him sick, for this week the official letters are fathered by Gorham, and as usual, it is water and porphyry. These letters, of course, are for outsiders; private advices are not obtainable.

Insiders are evidently having circulated the report that when John W. Mackay arrives, which will probably be about the middle of April, we are to have a big up market. If this should prove to be the case, it will be different from previous actions of the market after Mr. Mackay arrived. For several years past, his presence has acted like a "wet blanket" on the market, for prices went down instead of up.

Al Havens, the popular Secretary of the Con. Virginia M. Co., has returned to the city looking the picture of health. He is loud in his praise of the Keeley bichloride of gold treatment, claiming for it the eighth wonder of the world. If Mr. Keeley can inject some honesty in mine managers, he can cure a sick stock market, which would take precedence over the other wonders of the world.

The suit of M. W. Fox against the Ha'e & Norcross directors and Nevada Mill & Mining Co. will probably go to Judge Hubbard today or tomorrow. At the public hearing the defense took about one week to tell, it is said, what he did not know. While he was speaking, the Comstock mills were turning out bullion.

News from outside mining districts continues uniformly favorable from the Quijota and Tuscarora districts, but the shares do not reflect it. Possibly the public has lost faith in the managers of the mines. From the Bodie district the news continues favorable. A six weeks' run of the mill to be made on Mono ore. If her ore is being taken out of the mine. The work being done in both Bulwer and Bodie is quite important.

Private news from the Comstock mines is uniformly favorable, and were the mines managed so as to conform to the laws under which the companies are incorporated, a big boom in the share market would follow. If the fight waged by the Mining Stock Association to create a reform in mine management, so that outsiders can have some show to the bullion produced, and the fight of the Brokers' Combine to compel the rings to buy stocks with which to control the mines, are continued, it will force insiders to the rescue and the market will be saved. Why don't the mining companies lease the mills and mill their own ore? By doing this, all suspicion of collusion will be allayed. The impression prevails that if honesty was aimed at in the management of the mines, this would be done. While whether large fortunes are made through the present milling system on the Comstock may be an open question, it is a fact that the companies said to belong to the mill ring, who lost heavily on the bear side of the share market in 1886, is now reputed to be richer than ever, and those who lost heavily in the wheat deal in 1887 are now better off than before they inaugurated the hull campaign in wheat. With these facts ever present before us, it does seem the height of nonsense to give favorable news from the mines.

Eastern Metal Markets.

NEW YORK, March 30.—The following are the closing prices the past week:

	Silver	Silver	Copper	Lead	Tin
Thursday.....	40 9-16	88 1/2	12 1/2	4 1/2	19 90
Friday.....	40 7-16	88 1/2	12 1/2	4 1/2	19 85
Saturday.....	40 7-16	88 1/2	12 1/2	4 1/2	19 85
Sunday.....	39	85	12 1/2	4 1/2	19 85
Tuesday.....	39	85	12 1/2	4 1/2	19 75
Wednesday.....	39 1/2	85 1/2	11 5/8	4 1/2	19 75

Quicksilver is steady. Tin is fairly steady, as is 1 ad. Copper is a shade easier. Pig iron continues in buyer's favor.

The setback that silver has received in Congress is very discouraging to the silver miners. It was hoped that the Bland bill would meet with better success.

The largest artificial reservoir in America is Buena Vista Lake reservoir in Kern county.

MINING SHAREHOLDERS' DIRECTORY.

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COMPANY AND LOCATION.	NO. AMT.	LEVIED.	DELINQ'T AND SALE.	SECRETARY.
Andes M Co, Nevada.....	38.....	25c.	March 8, April 11, April 23.....	J W Twiss, 3/3 Montgomery
Best & Belcher M Co, Nevada.....	51.....	25c.	March 3, April 7, April 29.....	L Oshorn, 3/3 Montgomery
Belcher M Co, Nevada.....	43.....	50c.	March 8, April 16, May 3.....	O L Perkins, 331 Pine
Bullion M Co, Nevada.....	37.....	25c.	March 17, April 21, May 11.....	R R Grayson, 331 Pine St
Butte New York M Co, Nevada.....	9.....	15c.	March 10, April 12, May 5.....	C E Elliott, 303 Montgomery
Orvora Point M Co, Nevada.....	27.....	50c.	March 19, April 19, May 10.....	J H Newlands, 331 Pine
Fall River Con G M Co, California.....	7.....	2c.	Feb 24, April 2, April 25.....	I Cassel, 115 Foot
Golden Fleece Gravel M Co, California.....	16.....	\$1.00.	Feb 30, Mar 24, May 7.....	W J Gleason, Phelan Block
Golden Prize Con M Co, Nevada.....	5.....	25c.	Feb 23, April 2, April 23.....	O D Bennett
G & H Mountain M Co, California.....	6.....	42c.	March 29, May 3, May 23.....	J F Curtis, 218 Grant Avenue
Guasacaran and California M Co, B.C.....	6.....	\$3.10.	Feb 9, Mar 15, Apr 5.....	E Oliver, 22 Mt Ave
Hale & Norcross M Co, Nevada.....	101.....	50c.	Mar 24, Apr 28, May 20.....	A B Thompson, 3/3 Montgomery
Head Centre and Tranquility Co, Arizona.....	4.....	3c.	March 14, April 19, May 12.....	J W Pew, 310 Pine
Kentuck Con M Co.....	3.....	15c.	March 22, April 26, May 19.....	J W Pew, 310 Pine
Keystone Con M Co, California.....	4.....	\$2.50.	March 4, April 19, May 3.....	J H 1, 310 Pine
North Belle Isle M Co, Nevada.....	19.....	20c.	March 1, April 5, May 3.....	J W Pew, 310 Pine
Original Keystone M Co, Nevada.....	9.....	10c.	March 4, April 14, May 7.....	F E Lutz, 330 Pine
Overman M Co, Nevada.....	63.....	50c.	Feb 10, Mar 15, Apr 6.....	G D Edwards, 413 California
Peer M Co, Arizona.....	12.....	10c.	Feb 21, March 26, April 23.....	A Waterman, 303 Montgomery
Pine Hill M Co, Nevada.....	1.....	10c.	March 24, April 15.....	Chas. H. Hare, Stuart St
Si-kijou Cons Quicksilver Co, California.....	3.....	1c.	March 15, April 26, May 19.....	E F Stone, 306 Pine
Utah Ore M Co, Nevada.....	14.....	2c.	Feb 3, Mar 11, April 23.....	A H Fish, 309 Montgomery
Weldon M Co, Arizona.....	6.....	5c.	Feb 9, Mar 15, Apr 14.....	A Waterman, 303 Montgomery
Yellow Jack M Co, Nevada.....	10.....	5c.	Feb 2, Mar 4, Apr 2.....	W H Blauvelt, Gold Hill

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Bulwer Con M Co, California.....	Annual.....	L Oshorn, 309 Montgomery.....	April 13
Chamblin M Co.....	Annual.....	T Wetzel, 321 Sansome.....	April 9
Chas. H. Hare Con M Co, California.....	Annual.....	Chas. H. Hare, Stuart St.....	April 9
Florida Hill M Co, Idaho.....	Annual.....	R R Grayson, 331 Pine.....	April 12

LATEST DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Cone Cal & Virginia M Co, Nevada.....	50.....	A W Weaver, 309 Montgomery.....	Aug 17
Eureka Con M Co, Nevada.....	25.....	H P Burdett, 61 Sansome.....	Jan 5
Great Western Quicksilver M Co.....	25.....	A Halsey, 323 Montgomery.....	Oct 1
Pacific Coast Borax Co, California.....	1 00.....	A H Clough, 230 Montgomery.....	Apr 11
Standard Cone M Co, California.....	10.....	J W Pew, 310 Pine.....	Mar 26

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

PACIFIC RAFTING Co., March 25. Object, to carry on the business of constructing rafts of logs, trees, timber, poles, wood and lumber, and transporting the same from point to point on the Pacific ocean. Its says harbors, inlets and tributaries. Capital stock, \$360,000. Directors—E. C. Piche, D. B. Conness, George Gray, C. M. Elliott and F. M. Nilson.

SAFETY GAS-COCK Co., March 25. Object, to make patent safety gas, steam or other cocks. Capital stock, \$100,000. Directors—Henry T. Scott, George Loomis, E. W. Hopkins, David Bush, Silvey M. Smith, E. A. Grow and R. H. Pease.

OWE DRUG Co., March 25. Capital stock, \$20,000. Directors—P. J. Torrey, R. E. Miller, D. W. Kirkland, H. O. Trowbridge and F. S. Stratton of Oakland.

MEXICAN ZARAGOSA AND HIDALGO Mining Co. Capital stock, \$3,000,000. Directors—D. M. Dickhaut, E. F. May, Terence Masters, C. H. Chambers, of this city, and S. R. Norton of Sonora, Mexico.

THEY OBJECT.—The introduction of a bill in Congress providing for the establishment of a United States military post at Reno, Nev., by Senator Stewart of Nevada, is viewed with marked disfavor by members of the Nevada Miners' Unions. The miners consider that it is the entering wedge aimed at the destruction of their labor organizations preparatory to the reduction of their present rate of wages and that the soldiers at the post will be used against miners' union members should they resist any attempt to introduce cheap labor in working the mines. Should there be an uprising among the Indian tribes the Nevada National Guard is considered ample to protect the property and persons of the whites from injury. The companies of the National Guard are composed almost exclusively of miners, who would naturally side with the unions should an attempt be made to introduce cheaper labor in the mines. The miners' unions of Storey and Lyon counties contain 2500 members.

It may be interesting to know what the Trenton Iron Co. are doing in the wire rope tramway business, in addition to the line which they have just so successfully built for the Holy Moses mine in the New Creede district. They have received the following contracts: One line for the Amethyst Mining Co. in the Creede Camp, having a length of 8250 feet, and a capacity of 200 tons per day; another line of 5150 feet for the Smuggler Union Mining Co., in Ouray, Col., with a capacity of 200 tons per day; and another line for one of the Haggin mines in Guanacevi, Mexico, having a capacity of 100 tons per day, and a length of 5960 feet. They are also under contract for one of their large cable hoists for the Avondale Stone Co. of Pennsylvania, and have just completed a duplicate one for the Passaic Quarry Co. of Paterson. They are about to duplicate the big cable transfer over the Susquehanna at Williamsport; and are now constructing additional 800 tons per day tramway for the Pennsylvania & West Virginia Coal Co. in West Virginia, and another for the transportation of culm for the St. Bernard Coal Co. of Kentucky, and also a large haulage plant for the Croton Falls Magnetic Iron Ore Co. near Brewster, N. Y.

PLUMAS COUNTY MINERS.—Plumas county has organized a Miners' Association to operate with the State Miners' Association. The following are the permanent officers: President, Geo. P. Cornell of Crescent. Vice-presidents—J. R. Enscoe, R. L. McGill, R. Thompson, W. N. Goodwin, J. C. Knickrem. At large—James Jones of La

Porte; T. F. Emmons of Greenville; A. D. Hallsted, 12-Mile Bar; A. W. Keddie, Quincy; S. W. Cheyney, Johnsville; Alex. Cameron, Butt Valley. Executive Committee—T. L. Jones, A. R. Bidwell, E. C. Hard, F. G. Hail, J. H. Thomas. At large—A. W. Keddie and C. E. McLaughlin, Quincy. Secretary, Chas. R. Thompson of Spanish Ranch. Treasurer, H. G. Dorsch of Quincy.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING March 9.	WEEK ENDING March 15.	WEEK ENDING March 22.	WEEK ENDING March 29.
Alpha.....	35.....	35.....	40.....	40.....
Alta.....	80.....	90.....	81.....	90.....
Audus.....	50.....	60.....	55.....	55.....
Belcher.....	1.00.....	1.20.....	89.....	1.15.....
Belle Isle.....	25.....	25.....	25.....	25.....
Best & Belcher.....	2.13.....	2.30.....	2.10.....	2.43.....
Bullion.....	73.....	81.....	85.....	75.....
Bodie Con.....	55.....	70.....	54.....	55.....
Bulwer.....	41.....	43.....	40.....	45.....
Commonwealth.....	10.....	10.....	16.....	15.....
Yale & Oal.....	4.15.....	4.50.....	5.37.....	6.25.....
Challenge.....	80.....	90.....	85.....	90.....
Ohollar.....	1.10.....	1.35.....	1.10.....	1.35.....
Oonodance.....	2.40.....	2.10.....	2.25.....	2.10.....
Ore.....	11.....	11.....	11.....	11.....
Ore.....	75.....	20.....	20.....	30.....
Crown Polk.....	90.....	115.....	95.....	90.....
Crocker.....	05.....	05.....	05.....	05.....
Del Monte.....	35.....	40.....	30.....	35.....
Delta.....	31.....	40.....	35.....	40.....
Eschequer.....	31.....	40.....	35.....	40.....
Grand Prize.....	05.....	10.....	10.....	15.....
Gould & Curry.....	1.30.....	1.43.....	1.25.....	1.50.....
Hale & Norcross.....	1.20.....	1.53.....	1.60.....	1.75.....
Julia.....	11.....	11.....	11.....	11.....
Justice.....	30.....	40.....	30.....	35.....
Keotuck.....	10.....	20.....	15.....	15.....
Leah Wash.....	20.....	15.....	15.....	20.....
Mam.....	85.....	11.....	80.....	80.....
Mexico.....	1.50.....	2.05.....	2.05.....	2.05.....
Nevado.....	10.....	15.....	15.....	20.....
North Belle Isle.....	10.....	15.....	15.....	15.....
New, Oshorn.....	35.....	30.....	25.....	30.....
Ore.....	35.....	40.....	35.....	35.....
Ophir.....	2.80.....	3.65.....	2.70.....	3.05.....
Overman.....	40.....	61.....	40.....	1.05.....
Potosi.....	1.15.....	1.25.....	90.....	1.35.....
Pearce.....	05.....	05.....	05.....	05.....
Peer.....	05.....	05.....	05.....	05.....
Savage.....	1.05.....	1.65.....	1.30.....	1.51.....
S. & B. M.....	35.....	45.....	35.....	40.....
Sierra Nevada.....	1.60.....	1.75.....	1.75.....	1.80.....
Silver Hill.....	10.....	10.....	10.....	10.....
Scorpion.....	1.45.....	1.70.....	1.45.....	1.60.....
Union Ore.....	25.....	40.....	25.....	30.....
Utah.....	1.10.....	1.20.....	1.10.....	1.25.....
Yellow Jacket.....	1.10.....	1.20.....	1.10.....	1.25.....

Assessments added.

San Francisco Metal and Coal Market.

ANTIMONY.	THURSDAY, March 31, 1892.	STEEL.
Per lb.....	@ 14	English, D..... 15 @ 20
Refined, in car lots 8 @	—	Old tool..... 8 @
Powdered, do 8 @	—	3/4" Diam'd tool 9 @ 9
Concentrated, do 7 @	—	1/2" & Hammer 8 @ 10
All grades, coming at advance	—	Acchinery..... 4 @ 5
COPPER.		COAL.
Bolt..... 22 @	—	6 V. steel grade
Sheathing..... 22 @	—	1420, spot..... @ 6 00
Eng'g, jobbing..... 22 @	—	Tharcoal, 1420..... @ 6 00
Do, wharf..... 22 @	—	Do, roofing, 1420..... @ 6 00
Fire Box Sheets..... 24 @	—	Do, 20x22..... @ 12 00
IRON.		PIG TIN.
Bar, base..... 3 @	31	Spot #1, irreg..... 21 @ 22
Norway, base..... 41 @	54	ular..... 21 @ 22
PIG IRON.		SPIT FROM LARD PER TON.
Eglington #1 ton..... 25 00	—	Wellington..... \$8 01
Glenbrook..... 25 50	—	Gretta..... 7 25
Do, No. 1..... 25 00	—	Do, No. 2..... 7 25
Oregon No. 1..... 30 00	—	Gilman..... 6 50
Puget Sound..... 30 00	—	Seattle..... 7 00
Olay Lake White..... 34 00	—	Coe Bay..... 6 00
Langdon..... 25 50	—	Cannel..... 8 50
Tharcoal..... 26 00	—	Do, 1420..... 8 50
Gatsherrrie..... 26 00	—	Cumberland, in sacks..... 15 00
Barrow..... 25 50	—	Do, bulk..... 14 00
Carbide..... 23 00	—	Wallend..... 7 50
CHROME IRON ORE.		Scotch Splint..... 7 50
Per ton..... 10 00 @	—	Brynm..... 7 50
LEAD.		West Hartley..... 8 00
Pig..... @ 44	—	TO LOAD PER TON.
Bar..... @ 5	—	Australian..... @ 7 00
Sheet..... @ 7	—	Liverpool 38 F..... @ 6 00
Pipe..... @ 6	—	Scotch

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Chains all Sizes and Lengths Manufactured to Order. N. B.—Drill Steel, any Length
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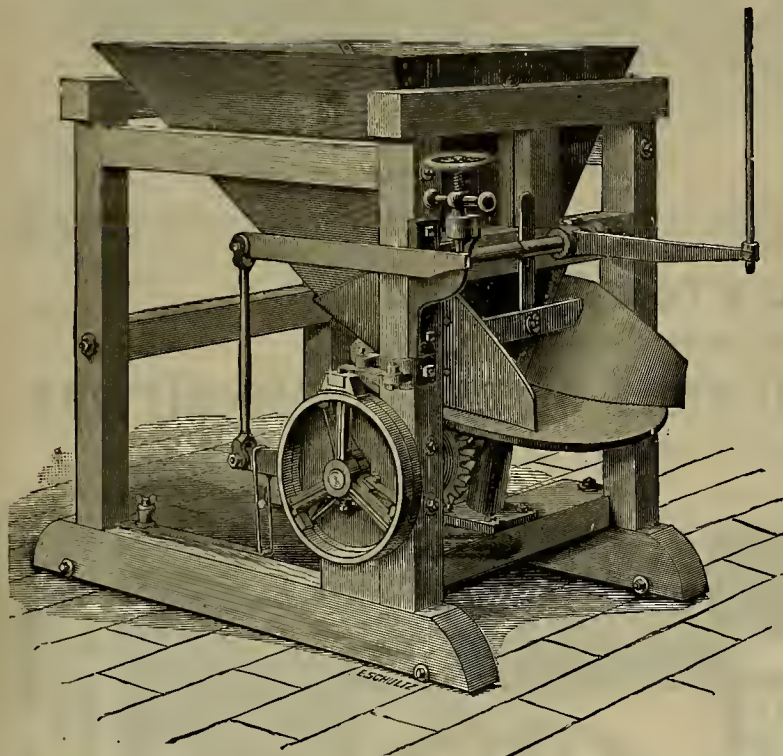
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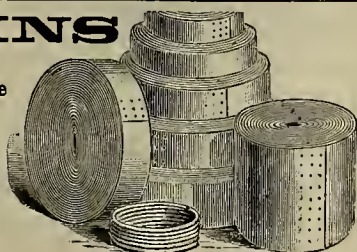
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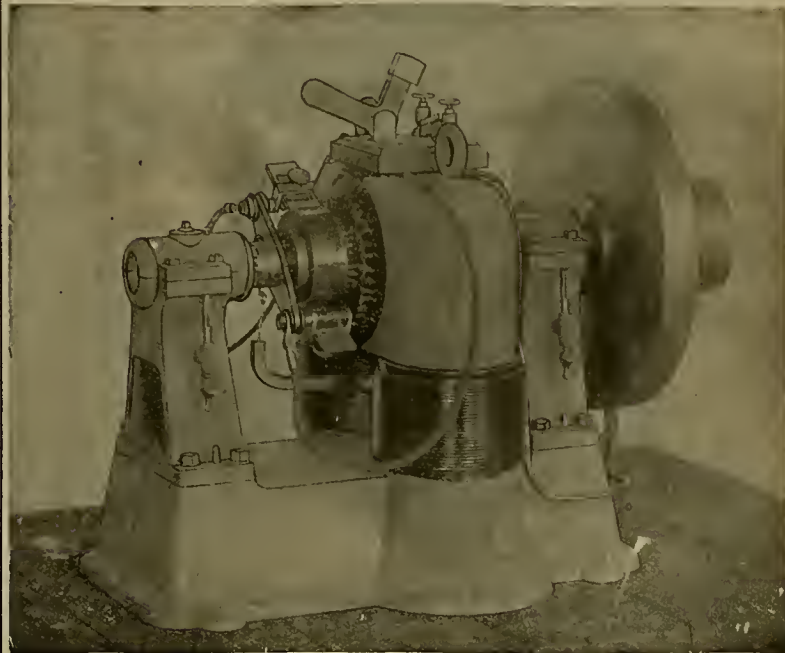


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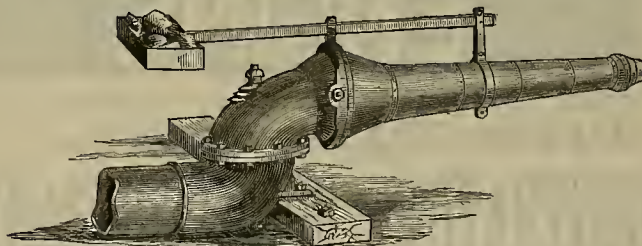
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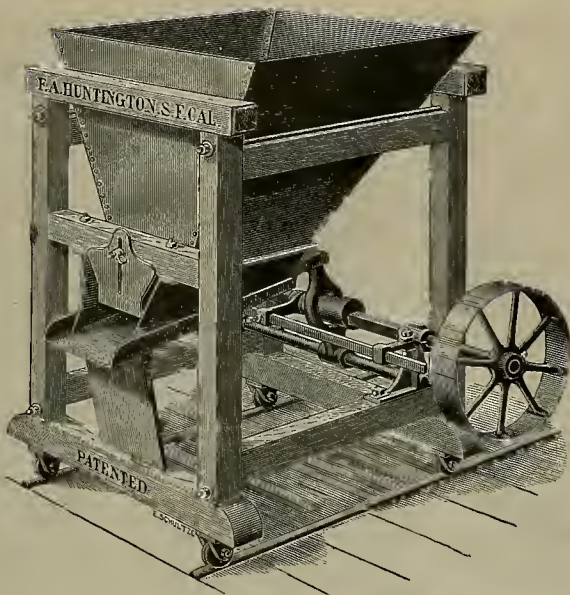
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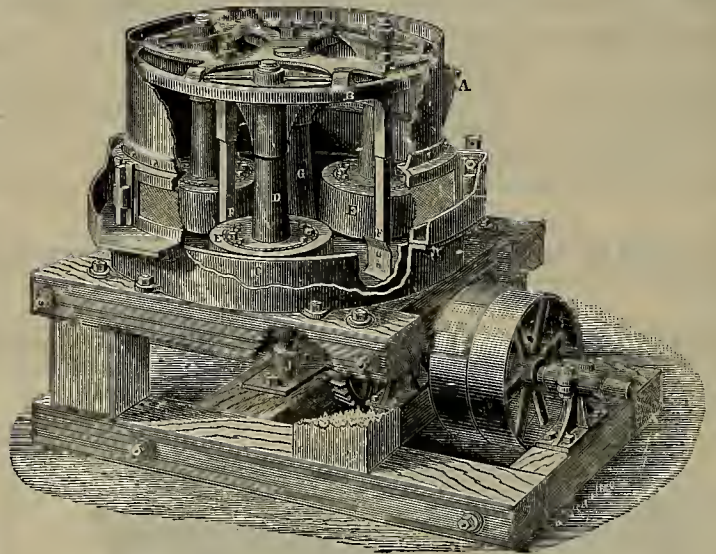


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This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

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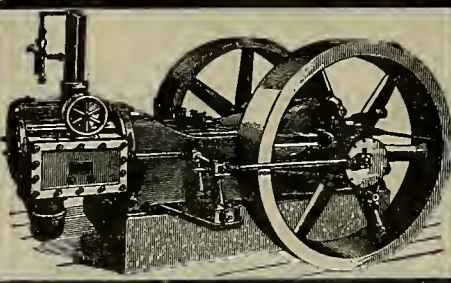
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NEW IMPROVEMENTS
UNEQUALLED REGULATION
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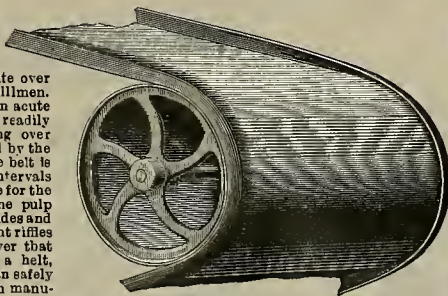
THE BEST ENGINE FOR ELECTRIC LIGHTING ELECTRIC
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THE BLASDEL CONCENTRATING BELT COMPANY.

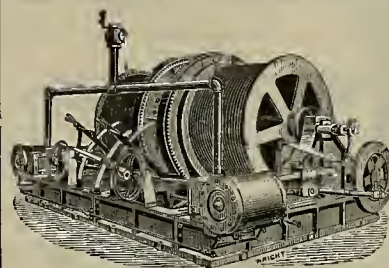
We have now made arrangements to have our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers, thus the vibration and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight riffling surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from hanging on the sides and forming channels through the center. These slight rifflings also save very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better belt than has ever been manufactured for use on this coast. It will last much longer and will handle fully one-third more pulp than any smooth belt, and will save a higher percentage of sulphurets.



H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.

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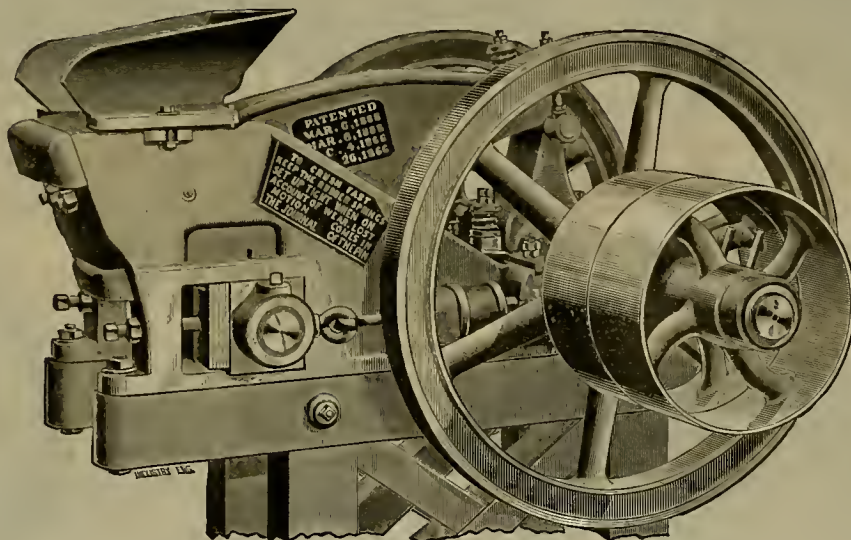
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GENERAL AGENT FOR WESTINGHOUSE AUTOMATIC ENGINES.

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Affords the most simple and reliable power for all mining and manufacturing machinery. Adapted to heads running from 20 up to 2000 or more feet. From 20 to 30 per cent better results guaranteed than can be produced from any other wheel in the country.

ELECTRIC TRANSMISSION.

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THE PELTON WATER WHEEL CO.

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PELTON WATER MOTORS, Varying from the fraction of 1 up to 40 and 50-horse power, unequalled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. Address as above.

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UNLIMITED IN CAPACITY. UNEQUALLED IN EFFICIENCY, UPWARD OF 3,000 NOW IN USE. Will do more than twice the work of any other with the same cost in wear. Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

It having come to the notice of the undersigned that their patent rights are being infringed upon, intending purchasers are hereby warned that all such infringements will be duly prosecuted. (Signed) THE PELTON WATER WHEEL CO.

THE PELTON WATER WHEEL CO. 121-123 Main Street San Francisco, General Western Agents.

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Estimates furnished for Electric Railways, Electric Lighting and House Wiring. Marine Work a Specialty.

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IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAM PLATES for SAVING GOLD In Quartz, Gravel and Placer Mining.

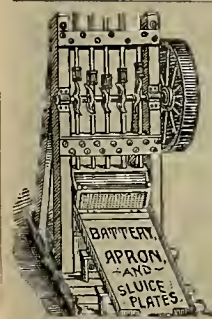
PRICES GREATLY REDUCED. ONLY REFINED SILVER AND BEST COPPER USED. OVER 3000 ORDERS FILLED. FIFTEEN MEDALS AWARDED. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated. These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Streets, San Francisco.

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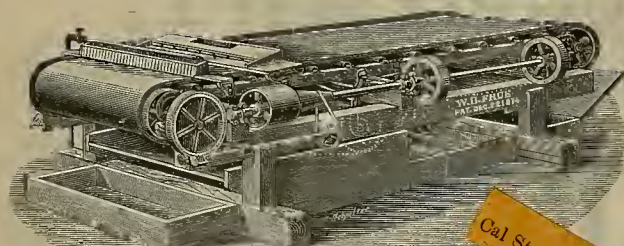


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OVER 3200 IN ACTUAL USE.

Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.



MESSRS. ADAMS & CARTER, 132 Market Street, San Francisco, Cal. — GENTLEMEN: After a continuous trial of different concentrators comprising the Frue Vanner, the "Holland," "Paradox," "Triumph" and the "Woodbury" concentrators, extending over several months, we find that we refer the Frue Vanner, as it is easier of adjustment, runs smoother, has less wear and tear, and—having a positive travel—gives less trouble than the other more complicated and ever changing machines now in use here. The Frue Vanner not only saves a cleaner concentrate, but has less loss in the tailings, and is in several ways preferable to the other concentrators here.

SAN JACINTO ESTATE, LIMITED,
Office of General Manager,
P. O. Address, South Riverside, San Bernardino Co., Cal.
CALIFORNIA, Dec. 18, 1891.

I am, my Dear Sirs, Yours faithfully,
S. HARRIS, Manager.

For any information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.

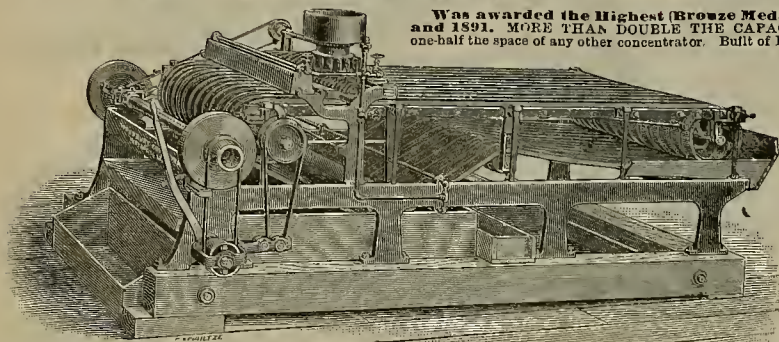
ADAMS & CARTER, Agents FRUE VANNING MACHINE CO..

132 Market Street. — — — San Francisco, Cal.

Price of 4-foot wide Plain Belt Frue Vanner..... \$280.00
" " Improved Belt Frue Vanner..... 800.00
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Was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THE CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of Best Steel and Wrought Iron. Strong and Durable.



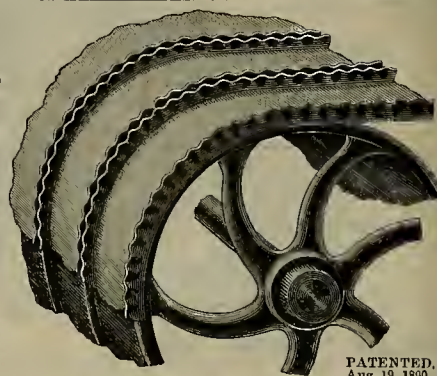
Price.....\$575 f. o. b.

Send for Catalogue and Testimonials.
The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. This excess in length of material effectually prevents the edges from cracking, plain edge belts have to stretch about one inch to the foot as they pass around the drums. This continuous stretch cracks the edges. The improved belt obviates that difficulty.

THE SAN JACINTO ESTATE, LIMITED—Office of General Representative, P. O. address, South Riverside, San Bernardino County.
CALIFORNIA, February 17th, 1892.

GEO. E. WOODBURY:—Your letter of inquiry about your concentrator came to hand in due course. Your machine is doing well, the motion is all right, and the machine is giving entire satisfaction. Yours faithfully,
S. HARRIS.

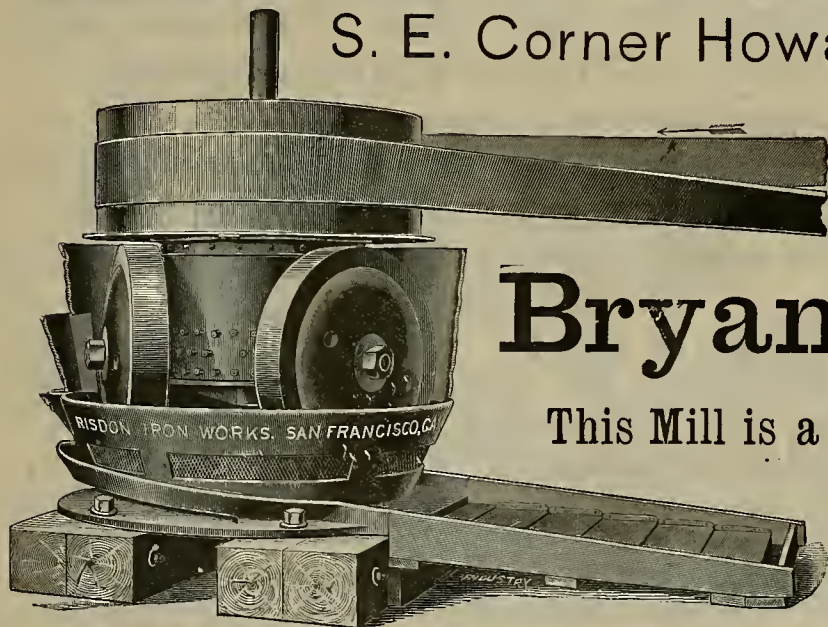
GEO. E. WOODBURY, Man'fr, 213 to 219 First St., San Francisco.



PATENTED
Aug. 19, 1890.

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MANUFACTURERS OF THE

CELEBRATED

Bryan Roller Mill.

This Mill is a Modification of the well-known "Chile Mill," arranged for the Continuous Crushing of Gold and Silver Ores.

It is POSITIVELY the best Gold Amalgamator in the market.
It saves from Five to Twenty-five per cent more gold than other mills.
Its immediate and free discharge prevents the possibility of sliming.
It requires a minimum of power and crushes hard as well as soft ore.
Its comparatively slow speed insures freedom from excessive wear.

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MANUFACTURERS OF IMPROVED MINING MACHINERY OF EVERY TYPE AND SIZE.



NOTICE TO GOLD MINERS!
SILVER-PLATED AMALGAMATED PLATES
For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

SAN FRANCISCO NOVELTY, GOLD, SILVER AND NICKEL PLATING WORKS,
68, 70 & 72 First St., San Francisco, Cal.

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—DEALER IN—

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BATTERY SCREENS AND WIRE CLOTH.

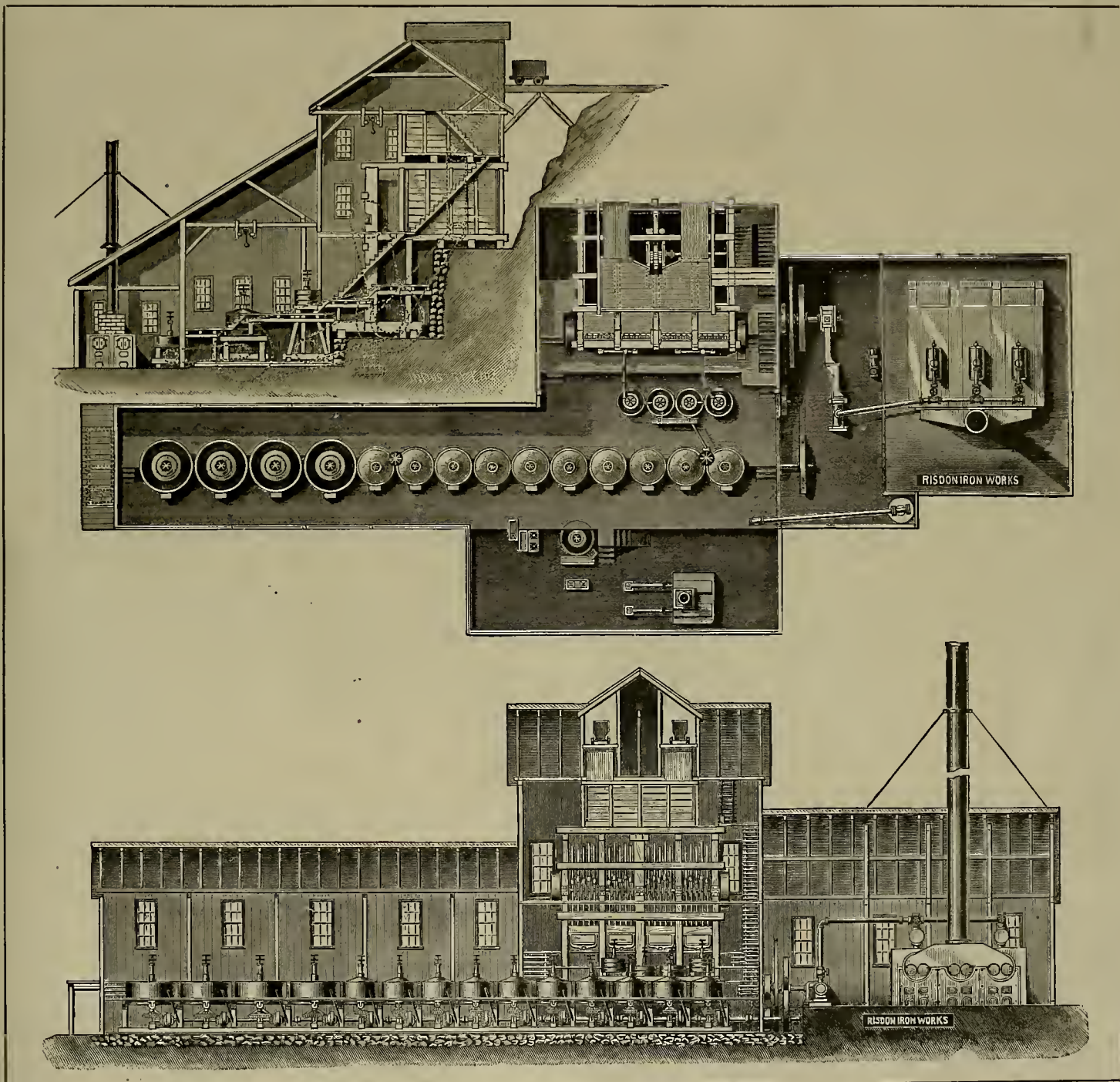
Agent for HOSKINS'

HYDRO-CARBON ASSAY FURNACES.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV. — Number 16. SAN FRANCISCO, SATURDAY, APRIL 9, 1892. Three Dollars per Annum.
DEWEY PUBLISHING CO. SINGLE COPIES, 10 CENTS.



TWENTY-STAMP WET CRUSHING SILVER MILL—BOSS CONTINUOUS SYSTEM OF AMALGAMATION.

The Boss Process of Amalgamation.

The introduction of this system of pan amalgamation into silver milling has been very thoroughly effected, and has proved that it has many excellent features that recommend it, and make it superior in many respects to the tank system of pan amalgamation. The large saving in labor and in power, the cleanliness, the reduced wear and tear because of the uniformity of the load, together with the reduced space re-

quired, and other advantages, make the continuous system of pan amalgamation the favorite with many mine and mill owners. This system gives an exact and equal distribution of pulp through all the pans and settlers, a thorough and uniform mixture of the chemicals with every portion of the pulp, and a rapidly increasing temperature in the amalgamating pans, insuring to each particle of pulp a uniform treatment.

The accompanying plates illustrate a mill equipped with the system referred to, in

which the ore receives precisely the same treatment as in the tank mill, until it has been discharged from the battery; from whence it flows through suitable pipes to the first special grinding-pan, and thence to and through each grinding-pan in the same manner, thence to and through the chemical mixers (where the chemicals are introduced by the chemical feeder), and thence in like manner to and through each successive pan and settler in the order of their arrangement.

The quicksilver supply and its distributing pipes are so arranged that it can be introduced into either of the amalgamating pans as desired. Steam syphons are provided for cleaning the pans, and for a pass by to cut out any pan from the circuit for repairs. The cost of erecting the "continuous" mill is less than the tank mill because of its reduced size it requires less grading and less masonry for retaining walls. Power is applied to the pans direct

(Continued on page 266.)

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ed.

The MacArthur-Forrest Process.

The Experiments in California.

MIDDLE CREEK, Shasta Co.,

April 4, 1892.

TO THE EDITOR:—It being generally known that the Calumet Co. was the first to introduce the MacArthur-Forrest process into California on any practical working scale, my time has been considerably taxed in answering letters from very many mining men, not only in California, but elsewhere, all inquiring as to the practicability of the process, etc., etc. Seeing so many are interested, I have concluded to write a description of it, giving data so many desire, and let you publish it.

To preface, the process was first promoted by the Cassel Gold-Extracting Co. of Glasgow, Scotland; from there it was introduced into Australia, South Africa, New Zealand, and the United States. The patents for this country are held by the Gold and Silver Extracting, Mining & Milling Co. of Denver, Colorado, of which ex-Senator Tabor is president, and Col. T. L. Wiswall, secretary. This company was formed some two years ago, but little progress was made, however, until within the past year, and since the Denver company completed their 15-ton mill and commenced working ores, which gave such unexpected and satisfactory returns, in the way of high per cent, that every investigator was filled with wonder, and saw the revolution likely to follow.

On my attention being called to it, now one year ago, I at once started for Denver, and was allowed all the desired privileges for a close investigation. The more I investigated, the more merit the process presented, and I soon became convinced that it was worthy of more than a passing consideration; in fact, in my own mind, concluded to "sail in" and find out all about it, on practical working of our own ores. Returning to California, I commenced a series of experiments, agreeable to instructions received in Denver from their leading chemist, and soon made better results on our ore than made in Denver. It now took no time to decide as to the propriety of introducing the process on a large scale in the Calumet mill, under my management, and where it is now doing satisfactory work and being extended, and will be up to 100 tons a day.

It may be information to many to state that in South Africa 13 mills are now operating the process with great success, and that mills are already in operation in Colorado, Utah, Montana, Dakota and California. At the Needles, in San Bernardino county, a 100-ton mill is in course of erection. Being among the first in this country to accept its merits, I fancy, by this time, I know something about it, and hence presume to speak.

The MacArthur-Forrest process is the use of a weak solution of cyanide of potassium. The strength of cyanide should be, as testing your ore will show, the proper per cent for extracting the highest per cent of the precious metals, say from one-half of 1 per cent to 1½, then treating your ore for a given length of time with this solution; time for treatment is according to the character of your ore and metals, how much base and what kind. To get at this correctly, a few tests are necessary; but it is easily worked out. And here, it is proper to state that time is more the factor of per cent than a high per cent of cyanide. We have made many tests on this point, and all clearly establish this fact. I have failed in per cent of extraction on some ore, and then, by a few experiments, gained high per cents from same. It is a process of study, but once you get time and per cent determined, then there is no failure in your extraction from that especial ore, no matter to what extent you may go. So true has this been with our working, on small and large scale, that taking any ore, from any mine, I would not hesitate to build a 50-ton mill on a simple test of 50 pounds, if the per cent of extraction was satisfactory.

There are two modes of having action from the cyanide on the ore; one is by agitation, and the other is by time and percolation. Revolving barrels, or settlers, as used at times in silver mills, make good agitators. The percolating plan is the use of large tanks, whereby the ore rests in the solution and in time is percolated off into reservoirs. Agitators take attention and power; percolation, less attention and no power; besides, agitated material must be discharged into filtering tanks and allowed time to draw off. At Calumet, we first used agitators as per instructions but after trying percolating, gave it the preference, and are now pushing for enlarged capacity on this plan. This mode of working is being gen-

erally adopted in South Africa, presumably by Mr. MacArthur's instructions. From my S. A. correspondent, I learn they are now constructing all mills for this way of operating the process. The new mill of the Shasta company is also changing to the percolating plan. The Mercur mill of Utah was the first, in this country, to start on the percolating plan, on a scale of 30 tons per day. All percolated solution, whether from agitators or tanks, contain cyanide, gold and silver in solution; consequently, all vessels receiving the same should be perfectly tight, as you presumably are handling valuable liquid. This percolated solution is now transferred to the precipitating box, of size according to value of ore and quantity to be treated. The box used at Calumet is 14 feet long, with 14 apartments. These boxes have wire screens on the bottom, and are filled with zinc shavings four inches deep. The boxes are so constructed, that the solution is made to pass through the body of shavings, which precipitates the gold and silver in a dark blackish powder. By this part of the process, a given part of the zinc is destroyed; but this is of no particular moment, as the loss is but trifling in dollars and cents.

The process is very simple and easily worked, when you have your plant right, and start right on the per cent of cyanide and time for your special ore. As to reducing ore, it is as yet an unsettled question whether it is best to crush wet or dry, all points being considered. The majority of the mills are crushing their ore dry. The Calumet Co. has started out on a new lay, which I think will be the winning one; to wit, crushing by stamps, and running the cyanide solution through the battery instead of water. In other words, crush your quartz in the solution; thus you combine agitation, percolation and expedition.

This, though a new deal, suits us, and thus far no disadvantages present themselves, that override the advantages gained. Of course you have to keep pumping your solution back, and running round. For dry reduction, the Shasta Co.'s mill uses pulverizing barrels. The advantage gained by the use of barrels is, all the ore is of equal grain, and, as you do not require fine crushing for this process, by uniform grain of ore you do faster percolating. Time, however, is the essence of per cent more than fine crushing. As to cost of working the process, there is a good deal to know before this question can be correctly answered; to give some idea, will say from \$2 to \$5 per ton. You can extract the gold and a high per cent of silver from any ore. The question is as to time, and at what per cent of cyanide.

As to silver extraction, at first I paid no attention to it, but have found the process very efficient, except requiring more time than gold; yet silver is in so many combinations that testing should be the only guide for any especial ore. It will work readily all ores worked by pan amalgamation. Taking California ores, from some it will often extract more silver than the total cost of milling. As to cost of plant, for gold it is very much cheaper than the ordinary first-class mill; for silver, the expense will not be half the cost of pan mills.

To express myself as to the process, will be to declare it one of the wonders of the times. I am aware that it has not the friendship of some men of science who talk wisely on what they don't know. To me, all opposition is as a puff of wind in the face of every day demonstrated facts as I handle the process. I have been cursed too often by disappointments in yields, by our old systems, to not appreciate the fact of always being sure of a high per cent of the value of the ore I treat.

One of the astonishing features of the process is, that you can take the heaviest sulphureted ores, and, without roasting, extract 95 per cent of the value out of same, and then you cannot detect any perceptible difference in their appearance. This was the hardest part for me to realize, but I have long ago gotten over the doubt, but not the wonder.

One of the inviting features of the process is that all the machinery you want is for reducing your ore, and power to drive it; and what a comfort there is in this, every millman can realize. Then, coupled with the fact that your returns are certain, a wise man can grasp the future of mining. Thus I give the reader some idea of what the process is. Of course there is more or less detail, which can only be gained by practical manipulation of it.

ALMARIN B. PAUL,

Gen'l Man'g'r Calumet G. Min'g Co.

Questions Concerning the Smyrna Fig.

SAN FRANCISCO, April 4, 1891.

TO THE EDITOR:—As I have been asked different questions in regard to the Smyrna fig and its relation to the gallwasp, I think

it convenient to answer them in your esteemed paper instead of answering separately in different letters.

1. Do you think the fertilization, and in consequence the officiating insect, necessary for the production of the Smyrna fig?

I am convinced it is necessary from the time I learned the views of Prof. Count Solms Laubach, but I confess that, like many others, for a considerable time I have been a skeptic in this matter, and considered capricious a superstition, although I should have known that there exists no superstition that is without some foundation. Superstition always rests on misunderstood or wrongly interpreted facts, and in this case capricious, if a mere superstition, could not have lasted 3000 years if its believers had not seen real benefits resulting from its practice.

2. Are you certain that the blastophaga introduced in spring or summer perishes without offspring?

As to the fact—yes.

As to my explanation, I am not quite certain. There are several explanations possible, but the fact has been noticed and described 3000 years ago by Theophrastus, is confirmed by modern investigation, and here in California also by several failures in the permanent introduction of this insect.

3. Are you certain that the blastophaga can be found in the wild fig during winter?

Yes, because all real gallwasps hibernate in their winged form, with the sole exception of the genus *Teras*, of which I know a European species *Teras Terminate*, which passes the greater part of the winter in the larva state. This exception probably extends to our California *Teras* and may have its cause in the fact that the species of *Teras* inhabit galls of organs that remain in connection with the tree, viz., branches, while all the other gallwasps, as far as I know, produce their galls on deciduous organs, viz., leaves or flowers. The genus *Andricus*, for instance, the cause of galls in the catkins of oaks, falls down with the withering catkin, and consequently has an exceedingly short existence in its larva state.

4. Are you certain that the Smyrna insect will be found in Northern Mexico or elsewhere at a distance nearer California than Smyrna?

Not the Smyrna insect, but another insect doing the same service. In the year 1865, Major Preiss, living near Guaymas, sent me, among other things, some figs of a native tree, which he described as being highly ornamental. These figs must have swarmed with the little parasite, because the cotton and paper were full of dead ones. At that time the observation was without practical value, but later, when the fig question was frequently discussed, I recollected the fact. Since that time I have spoken to several people about the matter, have sent at different times gentlemen to the district, but never obtained anything else except the pierced seeds of the fig, which fact proves that the insect had been there, but had escaped. Such seeds I have received from Lower California, Mazatlan and Hermosillo.

H. H. BEHR.

STRIKES IN EL DORADO COUNTY.—The Georgetown Gazette says: Rich strikes are becoming common this year hereabout. This is the best year for gold-dust our merchants have experienced for many years. We are glad to know that our prospectors are beginning to wake up. For years they have been in a stupor, and now wake up to find most of the best mineral land patented to agriculturists. It is too late now and useless to kick and growl. The Land Department made its rulings, and agriculturists improved the opportunity, while but few miners would take up a claim and hold it in compliance with law. If every man was imbued with sufficient enterprise and forethought to make the best of his opportunities, there would be fewer men cursing the laws and the people to-day.

DISHEARTENING.—We cannot expect any great activity in our ore shipments from now on until the silver hill has been acted upon. With silver below 90 cents an ounce and lead at \$15 per hundred, mine owners would rather have the ore remain in the mine than to rob them at the present ruinous prices. This, at a time when the mining outlook is unusually bright, is certainly disheartening to the people of the Western States.—Salt Lake Journal.

JIGGING.—The Inyo Independent says: Hi, Hamilton from Darwin reports the mining industry moving along steadily. There is considerable "jigging" being done, and this process, while it does not net very large returns to the owner, still it employs a number of men at good wages and evolves values out of old dumps, that otherwise would be useless waste.

The Lordsburg Silver Excitement.

The new silver camp suddenly formed near Lordsburg, not far from Pomona, in Southern California, is not destined to become a second Comstock, although when the strike was first announced the silver assays ran so high that the public was told the amount would influence the price of silver. Of course that was bosh and nonsense. The silver ledges are in the southern part of San Dimas canyon, which runs obliquely through the San Gabriel range of the Sierra Madre mountains. The ledges are seven miles northeast of Lordsburg and 11 miles north from Pomona. They are easy of access. Scores of prospectors have roamed over the same mountains for the past 30 years. There is a tradition among the Spanish and Indians in this region that about 1853 a miner named Hines found several ledges of the richest silver ore he or any one in that country had ever seen; that Hines went to San Diego to get capital interested in his mine and died on the desert on his way there, so all trace of the famous mine was lost.

There have, at different periods in the past generation, been numerous miners who have searched after the lost mine without success. Hundreds of people in the Pomona valley are now firmly convinced that the newly found ledges are those found by Hines and then lost. Jared Wincup, who has prospected for mines all over Nevada and Arizona since 1862, is the finder of the present Lordsburg silver ledges. He has been in the San Gabriel mountains for two years, and found silver ore in San Dimas canyon two weeks ago.

In conversation with a *Chronicle* reporter to-day, he said he knew he had made a great find, but had no idea of the importance of his discovery until he had the ore assayed. He was told that it would yield \$1400 to the ton. He was so delighted that just as soon as he had located his claim he told some men at Lordsburg. They came and saw his ledges, and from that hour the camp has grown at the rate of 200 men a day.

J. H. Mellzner, a drummer, happened to be in Lordsburg the day Wincup made known his find, and Mellzner took specimens to Los Angeles. Before noon the next day there were 60 men on hand from that city with camping outfits, picks and shovels.

The scene at the new mining camp has been most interesting to spectators. There are between 300 and 350 men now in San Dimas canyon. They have already come from distances over 100 miles away, and are from all classes of society. There are scores of old grizzled miners who have done nothing for years and who have packed their old camp utensils together and with blankets and shovels started pell-mell for the new mining scenes. Many of them have already staked out their respective claims, while others are prospecting the mountain and canyon for further finds.

There are about 100 young clerks in stores, farmers, lawyers, boys who have lived with their parents, and even school-boys, who have rushed into the camp and staked out claims here, there and everywhere, without the least idea of locating a ledge or of the indications of ore. There are over 75 men between 35 and 50 years who have come either to see if there is any chance for them to gain sudden wealth or to locate claims if they can see any for themselves.

One-half of all who flocked to the scene of the operations would not know a ledge of silver ore from ordinary dirt. Very many men have spent their last cent to get to Lordsburg, and as many more had to borrow money to get there. Every pick and shovel to be bought in Lordsburg or Pomona has been sold, and farmers have to-day been carting food to the mining camps. There are about 40 tents and 30 shanties up and down the little stream of water that flows through San Dimas canyon. Most of the men have come provided only with blankets. They have suffered because of the unusually chilly weather.

A peculiar thing about this new mining camp is the unusual secretiveness among all who are there. Every one seems to be suspicious of his neighbor, and no one will talk, except in the most careful and confidential manner, about the mining prospects or what has been found.

John E. Winters, who is one of the best informed prospectors in the Pomona valley, said to a *Chronicle* representative:

"I really believe that about five or six men in this camp have found silver ledges that will yield them good fortunes, but that is all there is of it. Wincup, the original finder, shows ore that will make some one very rich if the ledge runs very far down into the earth. Millzner has some very

rich ore, but he will not yet show where he gets it from. If he has a ledge of that kind of ore, he may pull out \$150,000 from this canyon. As for me, I can find nothing yet for myself.

"The rain has hindered work very much, but there are 300 men here who ought to be at home, and who are suffering for their madness for mining. I have been in many mining camps, but I never saw so many greenhorns as there are here. I expect another batch to-morrow and during to-night. They are coming all the time, and this paper ought to stop them."

Colonel J. W. Brooks of Pomona believes that there may be two or three very rich silver ledges in the canyon, but he says that is all there is of it. He has mined for 40 years all over California, but never saw so much and such widespread excitement over a new mining field so suddenly aroused.

World's Fair Mining Department.

The Colorado Board of World's Fair Managers is actively developing the mines and mining section of the exhibit of that State. Realizing the magnitude and richness of her mines and the wealth and variety of her mineral resources, this board has organized a special department of mines and mining and intrusted it with the work of preparing a mining exhibit which will be complete as possible and commensurate with the greatest and most prominent industry of the State. This managers have printed and distributed copies of this general classifications and rules of the department of Mines and Mining of the World's Fair, and have distributed it so thoroughly through Colorado that no mining point has been left without thorough and authentic information of the scope and character of the department.

It is intended that the exhibit of Colorado shall be both technical and economic in its character, showing at once the scientific classification of the mineralogy and lithology of the State, and a correct presentation of its geology, at the same time a popular and massive display of its resources in ores, building stone, coal, iron, commercial clays, oils and all other mineral products of whatever character. Its exhibit will, so far as now developed, be classified within the following divisions: Technical, economic, industrial, mining, metallurgical exhibit, mining machinery, statistical and historical.

The mineral exhibit from Michigan is sure to attract much attention. This will include, besides extensive collections from museums, etc., granites, marble and other building material of rare and beautiful qualities, but which have not yet been marketed to any great extent; raw material from the iron mines in plates 60 to 70 per cent pure, as taken from the mines; and, especially, specimens of copper, which, in its pure state, is found only in the Michigan mines. A copper exhibit, the "largest and most extensive ever attempted," will be made by the Calumet and Hecla mines. In speaking of it, the company's chemist says that it will include "obelisks of pure copper ranging in weight from 50 to 500 pounds; also quantities of wire and sheet copper that has been drawn and rolled from the native metal, just as it was taken from the mines; rods of copper bent into different shapes, and even tied into knots, as one would tie a cravat, without breaking or splintering, as would be the result of such an operation on the copper produced by other mines, and containing an alloy, which renders it less ductile. A curious fact concerning the silver deposits sometimes found in the copper is that nature has welded the silver and copper together without mixing them, whereas no process has ever been discovered by mineralogists by which the same thing can be done artificially; examples of this phenomena will be included in the exhibit."

Consul Partello, at Dusseldorf, informs the Mining Department that since the Emperor has expressed a particular desire that the iron industry of Germany shall be adequately represented at the Exposition, those engaged in the mining and metallurgy of iron throughout the empire have manifested great activity in that direction. From another German source it is learned by the department that Mr. Masseneq, the inventor of an important process for the desulphurization of pig iron by treatment with manganese, will make a full exhibit of the process and the products. This will be an important feature of the division of metallurgy.

A NEW PAVEMENT is finding its way into London, composed of granulated cork and bitumen, pressed into blocks, which are laid like bricks, and present an elastic surface, free from noise and secure for horses' feet.

Sulphur-Mining.

Some Facts Concerning the Industry.

The principal source of the sulphur used in this country is this Island of Sicily in the Mediterranean Sea, off the coast of Italy, and it is estimated that about 90 per cent of it comes from there.

The industry on the island is of great antiquity, but no very important developments have ever been made in the methods and apparatus for mining and fusing the mineral. This is partly due to the lack of enterprise characteristic of the natives, and the aversion of outsiders to invest any capital in the island's industry. Another thing, the seams and veins in which the brimstone generally occurs are so small as to render it unprofitable to incur the expense of mechanical or outfit gearings for regular work.

The richness and importance of a sulphur vein is not to be depended on, as daily experiences have proven that they are liable to "peter" out at a moment's notice. As a consequence, the industry continues as in the past, on a most primitive scale.

The majority of the mines employ hand labor exclusively, machinery being unknown to them. In many instances children are found carrying baskets of the mineral from the pit to the surfaces of the ground on their heads, and it is only in the larger mines that modern apparatus is employed, and even that consists of nothing but hoisting machinery and pumps.

There are practically four systems of melting sulphur employed in Sicily, says the *Manufacturers' Gazette*, the Calcherone, the Sinopoli furnace, the steam process and by Gill's furnace.

The Gill process is of English origin, and has been pretty extensively tried on the island, but it appears to have been unsuccessful, because it required skilled assistance, and but a small quantity of the mineral could be treated at a time.

The steam process is considered quite practical, but only when the mineral is very rich and porous. It emits no fumes, and the product is of good quality. The process consists in filling large iron tubes with the mineral and injecting dry steam into it.

The most popular processes, however, are the Calcherone and the Sinopoli. They require but little or no capital to operate, and are largely used. But, nevertheless, they are not without their disadvantages, for the fumes which they emit render vegetation an absolute failure for many miles around; the sulphur rock being used for fuel in these processes, a large percentage of sulphur is consequently consumed, besides about ten per cent still left in the mineral rock. Then the product is not so valuable as by the other processes.

But a process which appears to be the most scientific is one existing under Spanish patents, and the results obtained from it are excellent. A portion of the mineral to be tried for the perfection of this process was found by chemical analysis to contain 15 per cent of sulphur, and by the Calcherone 5.6 per cent, thus leaving in the mineral but 3.79 per cent of sulphur, instead of 9.4 per cent of the Calcherone. The estimated cost per diem of running a battery of 32 furnaces of the Spanish patent is placed at 69.70 lire.

We give here a detailed description of the popular Sinopoli sulphur furnace. This furnace consists of a series of six or more cells, having vertical, plate-iron walls, and in which cells the mineral is placed. The cells are arranged one above another, separated by a space of 12 centimeters. They are walled with an oven, around which are two fireplaces at different levels. The heat enters from the upper part into this separating spaces, and passing over the walls of the cells, increases the temperature to the melting point. After the cells are filled with this broken mineral, they are covered with a stratum of wet chalk with a hole in each box, which are used as outlets for the various vapors and gases of the mineral. Fire is then started, and after all these vapors and gases have escaped, the intensity of the fire is diminished gradually for 16 hours. When the fire is entirely out, the melted mineral commences to flow off from the front wall of the cell through a hole punctured in its lower part. The whole operation requires about 30 hours. The mineral contained in the six cells ordinarily does not exceed 75 tons, but by increasing the number of cells, and consequently the width of the furnace, the quantity of mineral increases in proportion.

In opening a mine in the United States to produce sulphur in competition with this Sicilian product, two facts must be considered: First, that labor in that country is very cheap; and secondly, freight rates from the island to all seaports is also very low—in fact, the owners of steamers used in the transportation of fruits from Sicily are glad

to get the mineral to use as ballast, and therefore charge next to nothing for its carriage.

This cost of mining cannot be exactly estimated, for the reason that all the mines do not present the same difficulties. Many are from 200 to 300 meters deep, while others can be worked at from 20 to 30 meters below the surface of the ground. The quantity of water to be pumped out, the hardness of the materials covering the brimstone ore, and the direction and dimensions of the seams all cause more or less expense. But as closely as can be figured, the mean cost for obtaining a ton of brimstone is 33 lire for the mining and hoisting, 8 lire for the fusing, and 5 lire for general expenses—a total of 46 lire. To this should be added the government and town dues, which reach as high as 30 per cent of the profits. The transportation of the mineral from inland to the seashore towns is made in part by railway, partly by mule back, the freightage varying in cost, of course, with the distance traveled, while some of the richest mining concerns have private narrow gauge railways for their transportation.

The Debris Bill.

A dispatch from Washington, dated March 31st, says: The California mining committee will probably decide that discretion is the better part of valor, and not attempt to push the debris bill to passage during this session. There is danger in doing so, and it might kill the bill, which really has many friends. Mr. Caminetti is engaged on an elaborate report, which he may present soon, but if it becomes apparent that serious opposition is to be encountered, the report may be held over.

Mr. McMurray has made many friends for the measure among the New York Congressmen, especially those from the city districts, and they have promised their aid when the time comes. Judge Searles has also done good missionary work, as have others of the committee; but the Californians are not quite sure of their ground, and they will ask that the measure be not brought up for consideration until they are sure that there is plain sailing ahead.

Mr. McMurray expressed the opinion today that nothing would be gained and everything might be lost by hurrying.

"We cannot afford to take chances," he said. "The disposition of the House is to be economical, a policy that can be changed to actual parsimony with very little trouble. This show of economy is for election purposes entirely, and there is danger that if the bill is brought up now it will be jumped on hard by the retrenchment and reform crowd, who will not listen to reason, but will make a spectacle of themselves in this act of knocking out a big appropriation."

"If we wait until next December, though, the election will be over. If the Democrats should elect their President, they will be ready and willing to make improvements where they are needed throughout the country, and the good features of our bill would find favor in their eyes. If, on the other hand, the Republicans are successful, the Democrats will conclude that, having gone before the country on a retrenchment and reform platform, and having been defeated, they had better bow to the will of the people and spend more money. Judge Searles is of my opinion. Don't misunderstand me in this matter. I believe our bill will become a law, and there is a question only as to the best time to bring it up in Congress."

If this plan, as outlined in Mr. McMurray's remarks, is decided upon, the gentlemen of the committee will probably return home soon, leaving one of their number to watch the proceedings here. Telegrams received by the gentlemen show that their work here is appreciated in California, and they have been urged to remain in Washington until they have accomplished their object.

ELECTRICAL STONE-CARVING TOOL.—The latest use to which electricity has been put is the working of a stone-carving tool. The inventor is Mr. W. P. Carstarphen of Colorado. The invention is known as the electrical reciprocating tool. The tool is provided with a reciprocating plunger, located and moving within the tubular spools of two coils of insulated copper wire, through which a direct current of electricity is alternately passed. With this tool the carver or sculptor, instead of dividing a portion of his attention to striking his chisel, can devote his entire attention to the lines which he is following, thus producing more accurate and rapid work. It is estimated that the machine will produce work in one-fourth the time of handwork, and therefore, a material reduction in the cost will be secured.

California Tin.

A dispatch from New York, dated March 30th, says: The first shipment of pig tin to reach this city from San Francisco arrived to-day on the Pacific Mail steamship Newport from Colon. It consisted of 334 pigs, weighing 22,000 pounds. This tin is of the best quality, equal to foreign Straits, and will be sold in small quantities to dealers in this city, as samples of an article which in a short time will supply the American market.

It is known as "Temescal tin," coming from the Temescal mines in California. It is consigned to Balfour, Adamson & Co. in the Cotton Exchange building. The consignment was shipped from San Francisco to Panama by the steamship San Juan, and transferred overland to Colon, where it was shipped by the Newport to this port. The consignment is the output of two weeks.

Mr. Simpson, of the firm of Balfour, Adamson & Co., was seen to-day and said: "This is the first consignment of American tin that has reached this city from San Francisco, and our firm is very proud of it. This tin is equal to that from the Straits settlements, and we have notified our brokers to that effect, authorizing him to sell in small quantities. The present shipment is a small one, but it is only this advance guard of what is to follow. As there is only one smelter at work at Temescal at present, it is not expected that the market will be flooded at once, but as soon as we get well at work we can supply the demand."

"The present price of Straits is from 20 to 22 cents per pound. We expect to sell our Temescal at the same rates, and have no idea that we cannot get it. Of course, in the event of large orders, we might do a trifle better in regard to the price. The only drawback at present is the shipping overland, the railroad freight being pretty steep."

"In shipping by water to Panama, overland to Colon, and again by water to this port, we are able to compete. We deny emphatically that America cannot produce tin of the best quality. We have made a statement to our brokers, giving full particulars regarding the tin. The consignees have had several demands made by those in quest of good tin."

"The chances are that the present stock will last only a few days. There was a rumor in the tin market this afternoon that advices had been received from London to lower the price of foreign tin, fearing that the American product may injure them."

CAST IRON.—Mr. Thomas Turner, in a chemical lecture at Birmingham, in speaking of cast iron says: Where special strength is needed care must be taken to have not only the right chemical composition, but also the size and shape of the casting suitable to the iron employed. Some iron is stronger in small castings than in large, while in exceptional instances the opposite is the case. In some forms of patterns, too, with abrupt changes of shape, planes of crystallization are developed, and these are the causes of weakness. Where great crushing strength is required, the iron should be hard and white, or nearly so. For transverse strength a very close-grained grey iron gives the best result; but where tensile strength is most wanted, the iron should be soft and a good working metal, but still close and dense. When iron is too soft, it runs easily and fills every line of the mould, but it is weak.

LORDSBURG is on the Santa Fe line, 37 miles from Los Angeles and 5 miles from Pomona. It is one of the boom towns, and is now being again boomed by a wonderful silver discovery which "beats the Comstock." A mining excitement has started, and men are going there rapidly, but there are more men than claims. This ore runs into the thousands, of course. The assays are supposed to tell that story. This is probably one of those knife-blade finds where it takes a 50-foot shaft to show a ton of ore.

GEORGETOWN DIVIDE.—The year 1892, so far, has been the best experienced for years in placer, seam and milling output on this Georgetown Divide, El Dorado Co. A renewed confidence has inspired the miners, and the result is very gratifying. A fixed purpose and steady perseverance will win in most cases.

STEEL TIES for railroads have not come into general use, but the New York Central has ordered several thousand of the metal ties, which will be put in between the Grand Central depot and Mott Haven Junction. The order has been given after a very successful and satisfactory trial on another section of the road.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH.—Correspondence Amador Ledger, April 2: At the Pacific, work is being pushed ahead. They are working on a huge water skip, for the purpose of getting out the water. It is reported that they have encountered the ledge in the big tunnel. We hope it will not be long before a full force of men goes to work again. The Bay State mine is still hard at work. The water has bothered them so that they have had to procure a pump. Still they are making good headway. The shaft is down nearly 300 feet, with good indications of a mine. The company has a regular pay day every month, which makes a few happy. At the Reeves mine they are taking down the hoist and moving it to the Henry Clay, which joins the North California mine, which C. F. Crocker has bonded for two years. The power to run this hoist costs \$2 per day, while at the Reeves mine for water, with 150 feet pressure. At the Henry Clay they will have 600 feet pressure. The skip is of one ton capacity. Mr. Ballard, of the New London, is having all the New London machinery shipped over to Tuolumne county, where he is interested in mining.

AMADOR GOLD.—Ledger, April 2: There is little new to report in the situation of the Amador gold mine. The reported compromise of the suit between the English and American stockholders has not yet been consummated, although we understand the terms have been virtually agreed upon. The property has been idle for more than eighteen months, and during this time the round timbers on hand when the attachments were served have become almost useless. The value of these originally amounted to several thousand dollars, and might have been sold readily at the time for full value. The principal creditor, however—the Pacific Bank—declined to assent to their being sold, and so the whole lot has been allowed to rot, and is now almost worthless. A representative of the Pacific Bank—Mr. Mitchell—visited the mine last Tuesday, no doubt to look around, and get an idea of the value of the surface improvements at a forced sale. It must be remembered that the bank has been paying the keeper's fees for eighteen months at \$3 per day, amounting at present to over \$700. The negotiations for the purchase of the Kennedy mine by an English company are now completed. It is doubtful whether the purchase will be made. The Kennedy company has been negotiating for the Volunteer mine and other land adjoining, belonging to James Meehan.

SUTTER CREEK.—Taking the water out of the Hector mine commenced in earnest yesterday morning with Maurice Finn and Reel Campbell at the engine. The skips have been put in excellent order and run like a charm. They expect to lower the water to the 200-foot level in about two weeks, when in all probability a temporary halt will be made, to enable them to clean out and open up the drift, from which they expect to get ore enough to run a portion if not the entire mill, until they can get to the deeper levels. In this way it is hoped to meet the running expenses by the product from the mill. As drifting on the ledge at the 900-foot level of the Wildman progresses the improvement is so noticeable that the prospects for a permanent mine are considered more encouraging than at any time since the present company took charge. Only a portion of the mill is running yet, on account of the repairing that is being done in the shaft. In a short time, however, the other stamps will be in motion, most likely on rock from the lower levels. W. Weymouth, superintendent of the Henry Clay mine, between Drytown and Plymouth, called on us this week, and stated that C. F. Crocker, the owner of the Henry Clay property, has bonded the North California mine, adjoining, for a term of years, and it is proposed to begin operations forthwith. A tunnel has been run from the Henry Clay almost to the North California, and it is proposed to prospect the latter by means of this tunnel. They feel confident of opening up a good paying mine.

Butte.

THE OLD RIVER CHANNEL.—Oroville Reporter, March 31: The recent discoveries of the ancient river channel, between Oroville and Bangor, the famous old blue lead, with its auriferous gravels extending for miles, promises to create a boom in mining circles greater than any in Butte for many years. This blue lead or ancient river channel is not a local mine, but it extends for at least 8 or 10 miles, and possibly much farther. There are opportunities for hundreds of rich mines to be developed upon it. At Bangor, the gravel is paying 50 cents per each half barrel, so that a man can take out from \$6 to \$8 each day. When steam engines are used so as to hoist the gravel quickly to the surface, when rock-breakers are made to pulverize the cement, and when all the known appliances of the most experienced miners are put in operation, the output per man will be greatly increased. As there is hardly a limit to this channel, and as it is very rich, the indications are that hundreds of men will be at work during the present spring and coming summer. The channel has been found through such an extent of country that miners are now prospecting for it in a dozen places between this town and Bangor. When struck in these different sections, each mine will be a starting point for others, and thus the whole distance may be threaded with parties of miners, each working the rich gravel and taking out thousands of dollars every day.

Contra Costa.

QUICKSILVER.—Gazette, March 30: The richness of the quicksilver mines in Napa are well known, and now developments are being made in San Antonio valley that promise to disclose a deposit equal to any yet discovered. The quicksilver mines in this county, which were crudely worked many years ago, lie between these two points, and are probably on the same vein. Sometimes expert will renew the prospecting in the San Antonio valley, and the probability is that the company of capitalists going after. Of the Segur a promising report says: "Recently a coalie valley, distant some thirty-

five miles from here, with a view to purchasing it should it turn out to their satisfaction. They recently started to crosscut a vein supposed to be four or five feet wide. At last accounts they had already gone in twenty-eight feet without having reached the edge. Samples of the ore were brought to town and are now on exhibition in McLeod & Wright's office. They are very rich. Should the mine continue to show up as well as it does at present the company will purchase it and begin active and extensive operations."

Calaveras.

THE MATSON MINE.—Angels Echo, April 1: The Matson mine, owned by Hayward & Hobart, situated in the southern part of this town, is one of the best mines in the county. At a depth of 100 feet a crosscut was run and the vein tapped. Then another 100 feet was sunk and another crosscut was run into the vein. This crosscut has been run forty feet into the vein from the front-wall and the hanging-wall has not yet been reached. The ore prospects well. Preparations are now making for sinking another 100 feet, which, when completed, will make the shaft 300 feet deep.

Del Norte.

AT SMITH RIVER.—Del Norte Record, April 1: Near Myrtle creek, on Smith river, C. F. Goodrich has a crew of men mining on the ground worked by him last year with partial success. This time he is having the ground worked different, running the dirt over plates into a "Tom," enabling him to save the fine gold.

El Dorado.

MINE SHUT DOWN.—Grass Valley Telegraph, March 31: The old Pacific mine at Placerville, from which upward of \$2,000,000 has been taken, shut down last week. It is understood, however, that the English company which now owns it, together with six other valuable locations on the same ledge, will soon resume work, utilizing the water power of their canal to generate electricity, by which means neighboring mines are being worked at a ridiculously low figure.

Mono.

BODIE CONSOLIDATED.—Miner, April 1: The ore stopes from No. 1 upraise, above the 500-foot Jupiter shaft level, are yielding fair milling ore. During the past week, north drift No. 1 from east crosscut, 600-foot level, was extended 18 feet. North No. 2, from above crosscut, was extended 12 feet. In both drifts the seam of ore is of good quality but small. South drift from No. 1 upraise, 600-foot level, was extended 8 feet. The ore in this drift is about 4 inches wide, of fair grade. The ore stopes from No. 1 upraise, above the 700-foot level, continue in rich ore.

Nevada.

THE BRUNSWICK MINE.—Grass Valley Telegraph, March 31: The development in the Brunswick Consolidated mine, for the last 40 feet, shows such an improvement that it looks as if, in the near future, there will be another bullion producer in this district. The ledge in the shaft is from 8 inches to 2 feet, showing free gold and high-grade sulphurets. It is in "ribbon rock," and five assays show a value of \$540 and \$560 per ton, the assays having been made by one of our most competent assayers. The prospects are so good that the company proposes to alter the mill, so as to have all the latest improvements—build tramway, large ore bin, place a rock-breaker and make automatic work as much as possible, all for the economical working of the ore.

TAKING OUT A CRUSHING.—Grass Valley Telegraph, March 31: Some time since, a party of Grass Valley mining men leased the Osceola mine, which is situated near Squirrel Creek, back of Rough and Ready. The Osceola was owned years ago by a party of Frenchmen, we believe, and Sam Locke was superintendent of the mine. In those days, the facilities for saving gold were not near as complete as they are now, and work on the mine was soon abandoned and but very little prospecting was done. The parties who now have the mine have found a new ledge, and every part of it shows gold. The ledge can be traced thousands of feet, and at any point you can break off a piece of the rock and find colors of gold. The lessees have taken out quite a lot of rock from a few feet below the surface, and are hauling it to the California mill, which is near by, for crushing. The crushing will be completed in a short time, if the weather does not interfere too much with the hauling of the quartz.

THE OMAHA'S DIVIDEND.—We stated the other day that in all probability the Omaha Mining Company had declared a dividend, as is getting to be its regular custom. Some of the directors were out of town (San Francisco), and the news of their intention about burdening the stockholders with another dividend did not reach here until to day, when it was found they would have to accept 75 cents per share on their stock as a dividend. This dividend No. 5. The mine is looking fine, and Mr. Mainhart says that many more dividends are in sight. The dividend was declared on the 29th instant.

A BRICK.—Grass Valley Telegraph, April 2: The Peabody mine still holds out well, with assurance of continuance. Mr. Tregidgo yesterday had a little gold brick worth \$2,400 that had been pounded out of 22 loads of ore, which ore came from the 400-level, and the ore below that level is just beautiful in gold and rich sulphurets. The Peabody is not a coming mine, it has come and to stay.

GOLD FLAT MINE.—Grass Valley Union, April 2: Good gold-bearing quartz has been struck a little below the 300 level in the Gold Flat mine, of which John Skewes is superintendent. This find is below the former workings, and is regarded as very encouraging. The vein is from 12 to 18 inches in width. This is the property formerly known as the Potosi, when it was worked by Bruce B. Lee as superintendent. The present company consists of residents of Grass Valley and Nevada City. A hoisting and pumping works, run by water power, were erected some months ago, and since their completion the old shaft has been cleaned out and repaired, and the work of development but recently begun. The quartz now being taken out carries a large amount of sulphurets, and also makes a showing of free gold.

A NEW COMPANY.—Grass Valley Telegraph, March 26: The El Dorado Gold Mining Company of Chicago has been incorporated with a capital stock of \$2,000,000. The incorporators are Chas. M. Joyce, N. K. Joyce and W. C. Rogers. This company has been organized for the purpose of

working a mining claim in Grass Valley district, known as the Bonanza Quartz and Gravel Claims, patented ground owned by H. B. Nichols and situated about two miles west of this town. These claims have produced thousands of dollars and some of the specimens have been almost solid gold. No attempt has ever been made to systematically prospect the ground and it is believed that the company have in these claims what may prove to be one of the richest mines on the coast.

Plumas.

MINING OUTLOOK.—Plumas County Bulletin, March 31: The mining outlook for Plumas is very much brighter than it has been for some years, both on account of the reviving interest manifest among the people and because of the unquestioned merits of numerous mining propositions in the various districts of the county. There is a disposition among miners and business men to develop the resources of the county. A great deal of prospecting is going on, many beds of gravel are being opened up and numerous quartz veins tapped. There seems to be an unusual degree of confidence in the mineral wealth of the county, and it certainly is well founded. People seem to be willing to put up their shoulder to the wheel of progress and push, roll, do something to benefit themselves and to bring about general prosperity. Instead of sitting around bemoaning hard times and criticizing the efforts of others, both old and young men have gone to work. The Newtown country, northwest of Quincy, is having quite a boom. Numerous locations have been made of late, and the work of development goes on, thus causing no little interest in that section and excitement with reference thereto. McLaughlin & Stephan have been pushing work at the Golden Gate, preparing to enlarge their mill and extract ore. Thompson & Kellogg, in their quartz mine near Butterfield, have reached the ledge, and a fine body of solid, good-paying ore is reported. H. P. Wormley has purchased the interest of his partner, J. P. Richards, in the quartz mine on which they have been working. The prospects are good, and Mr. Wormley has a show for a fine mine. Lee, Blakesley & Richards are developing the ledge recently discovered and located by them. Goodwin & Bell, and others, have made locations in the same neighborhood. Work is being prosecuted in the gravel mines of Thomas & Thompson, Emigrant Hill, Loring & Leavitt, Bennett & Co., Conley & Orr, and others. The mining prospects for the Indian Valley section of the county are unusually bright—better than for years past. The rich discoveries recently made in the McGill & Standard Consolidated, and at great depth, justifies the conclusion that the vast ore bodies of the county lose none of their richness with increased depth. This property is of such extent as to require many years to exhaust it. The Green Mountain Group is looked to with much confidence as to big results in the near future. The amount of ore in the various properties which the present tunnel will develop, and which are tributary to it, is practically inexhaustible. Much hope is based upon the development work now in progress in the Crescent mine. Should there be opened up at depth the rich ore veins that exist near the surface, the property will prove, as it has been, a great blessing to the town of Crescent and that section generally. The Plumas Consolidated is another property full of promise. It is generally understood that good bodies of ore have been reached during the past four months. Leaving this great mineral belt, a veritable mountain of quartz veins, and going to Genesee Valley, is found another section of the county promising much in the future. The Gruss mine though worked in a small way and at great disadvantage, has produced a great many thousands of dollars. We believe the property is scarcely prospected. The Plumas Eureka country is again coming to the front. Rich developments recently made in the Jamison mine insure much work on that property. A large mill will probably be erected the coming summer and development work engaged in on a large scale. By no means is the great Plumas Eureka mine worked out. She continues to produce, giving employment to a large number of men and scattering a great deal of money in the county. Both the La Porte and the Granite Basin sections of the county are more prosperous than usual. In view of these facts, and that the small hydraulic mines will soon be able to run, we think the future of Plumas county is far brighter now than for many years past. Citizens, therefore, should bestir themselves, take advantage of the situation, and by well directed and vigorous efforts, help intensify the movement now setting in.

San Bernardino.

THE IBEX MINE.—Needles Eye, April 2: Last year, P. K. Klinefelter and a few other gentlemen purchased the Ibex mine, on the desert about 11 miles from Needles. It was demonstrated that the rock carried gold in large quantities. The gold is there right in sight, and there is plenty of it, too. A shaft has been sunk to a depth of 48 feet, and while good-bearing ore has been encountered from the very surface of the ground to the present depth, it is a sight of the ore which they are now getting out which causes the eye to twinkle. The ore is a white honey-comb rock, in which the naked eye can see reposing, in snug little nuggets all through the cells and crevices, pure virgin gold. Upon the dump must be 30 or 40 carloads of this free gold-bearing ore, which will be shipped to the mill for treatment next month. The Eye has known of this property for three years, and has thought all along that the day was not far distant when the Ibex mine would prove a bonanza for Needles, and now it is coming to pass. Think of it! Tons upon tons of free milling ore, which, at a moderate estimate, carries \$500 worth of gold per ton, and then remember that this ore is only 11 miles from Needles.

San Diego.

THE GOLD DIGGINGS.—Julian Sentinel, March 31: The Cowles Bros. are doing work on the North Hubbard, and it is said will run their ore through the Hubbard mill. Mr. Chambers is continuing development work upon the Wilcox mine, and is bringing to view a quantity of rock, which of quality is more than encouraging. The pay rock that Frary and Johnson have struck in the Eagle continues good, and the boys are hopeful of a larger vein of higher grade to come and uphold the good name of this mine. Robert Gardner is following a promising lead of quartz in the old Blue Hill, which would not surprise anyone should it open out into another of those rich shoots for which that spot is

famous. Banner mining matters are as usual progressing steadily onward with no degree of unhealthy excitement. The Bailey Bros. have their pipe line in place, and their improved mill will be crushing ore in three weeks' time. The prospectors' season has opened and several parties have outfitted during the past week for desert exploration. Perseverance in this line bids to prove successful, and we prophesy a big strike in that direction from such continued effort. A party composed of Eastern capitalists and a mining expert came up Sunday and examined the Helvetia, with a view to buying and starting up the works. From remarks made by the viewer it is believed they were favorably impressed with this valuable property, and it is within the range of probabilities that the indebtedness will soon be liquidated, and further development of the mine prosecuted.

NEW DIGGINGS NEAR YUMA.—Los Angeles Herald, March 31: A new mining excitement has broken out near Yuma, on the California side of the Colorado river. A Herald reporter yesterday saw a gentleman of the highest standing in this city who had just returned from the camp. He showed a paper containing about \$10 worth of free gold, which had been panned out in less than ten minutes. The camp is in the Cargo Muchacho district, only about eight miles from Yuma. Miners are flocking in there by the hundreds. The new camp has a feature of stability about it, as it is adjoining the famous Blaisdale ledge, which pays the lessee \$2400 a month. The placers are not on the surface, but are found at a depth of about 40 feet, where a hard gravel is found, and in this it is said the gold can be literally picked out.

Shasta.

NOTES.—Redding Democrat, March 30: Monday, we saw some more samples of lead ore which came from the Cow Creek country, which assays 30 per cent. lead. The placer and gulch miners of the county are having a fair season this winter. This last rain storm is worth a good deal to them. John Wright of South Fork is running a tunnel to tap the rich ore chute on his mine, and drain the same of water. The Hidden Treasure mine on Sick Rock creek, just below the Iron Mountain mill, owned by Ed. Hume, Geo. Dix and two others, was bonded last week for \$8000. A portion of the mine runs into the patented land of the Iron Mountain Mining Company, and it is feared that the litigation started by Col. McGehee's will, will interfere with the sale. The owners of the Hidden Treasure will have to acquire title to a portion of the ground from the Iron Mountain Company. The Bell brothers have stopped work on their lead prospects near Round Mountain for the present, on account of water preventing them sinking deeper. They will resume prospecting when there will be less water to contend with. Joe Bell feels confident there is a big body of good lead ore in the vicinity of Round Mountain. He gets assays from his prospect running as high as 80 per cent. lead, and from 5 to 30 ounces in silver.

Sierra.

GIBSONVILLE.—Mt. Messenger, April 2: The Thistle shaft is employing about sixty men, with good prospects for large reinforcements in the near future. August Holz is superintendent, Eugene Squier clerk, and T. Costello and P. Frazer shift bosses. This is unquestionably a very valuable mine, and its success will ultimately lead to the opening up of other locations along the Gibsonville ridge. It will open a new era in the mining industry of Northern Sierra. It was formerly supposed that the Gibsonville channel and the one worked by the Thistle Shaft were identical, but it is now an established fact that the latter is a separate and more extensive lead. Pilot Peak, Switsure, Michigan, Union, Excelsior, Empire, Tabor and other mines, along the Gibsonville ridge, are thought to be very valuable mining locations. The Tabor mine, joining the Thistle Shaft on the north, will soon be pushed ahead. Its owners think that in a short distance their tunnel will tap the channel. The entire community trust that the company's hopes may be realized, mainly because the principal stockholder, Horace Tabor, has expended many thousands of dollars in trying to develop the property. The Fall River quartz mine, of Butte county, owned mostly by Wolters & Bro., of this place, is another, deserving of special mention. The company is running a hard rock tunnel to tap the main ledge, which, it is thought, will be reached about sixty feet ahead and yield handsome returns. The mining fraternity seem satisfied with the results of the miners' mass meeting of the 5th March, and are eagerly awaiting the action of Congress.

Siskiyou.

SALMON RIVER.—Yreka Journal, March 30: The half dozen stamp mills, aggregating in all about 60 stamps, and several arrastres, are crushing away night and day on rich rock averaging at the different mines from ten to seventy dollars per ton, while large quantities of ore have been exposed during late developments. A development tunnel 300 feet in length, at the Uncle Sam mine, has connected with the ledge at considerable depth below the upper workings, where it is large and extremely rich. A tunnel 600 feet in length, at the Mountain Laurel mine, has tapped the vein where it shows a width of 20 feet between walls, while the 20-stamp mill is unable to dispose of but a small quantity of the rock this mine is capable of producing. The Black Bear Co. continues to produce large quantities of rich rock from a thousand feet beneath the surface. The rich Portuguese mine, as usual, is producing quartz thoroughly impregnated, and often matted together with the yellow stuff. The Hungry Hill Company, on Knownothing creek, have struck their ledge in a long exploration tunnel about 600 feet below the surface and 300 feet below their present workings, showing a width of three feet, averaging \$30 per ton. The Knownothing mine is turning out considerable quartz, while most of the new discoveries located throughout this section are improving with development. The placer mines are being steadily worked, while new and interesting discoveries are occasionally being made. The Hickey Bros. have made the discovery of an extensive tract of gravel high upon the mountain side near Sawyer's Bar, which has yielded them nearly \$3000 in less than a month's run of ten hours a day, and promises to continue doing so for some time to come. The Russian placer miners on Salmon river, below the bar, are having unusual success this season, while Chris Barry, Bigelow, J. M. Fuller, and other indus-

trious and enterprising gravel miners, are being favored with success.

RICH QUARTZ.—Yreka Journal, March 30: A two-foot ledge of great richness has been found at the Empire quartz mine on Klamath river, near Honolulu, four tons of which yielded \$40 per ton, while some of the rock yielded as high as \$100 per ton. This mine has been tested thoroughly by our townsman, C. Lunker, of the Bella Union saloon, who expended several thousands of dollars in developing it, and all will be pleased to hear of his success realized for his perseverance in sticking to it so long. This mine is provided with one of the finest quartz mills in Northern California, and as soon as a good supply of quartz is taken out the mill will be started up. The quartz is very hard, but shows gold to the naked eye in all that is now taken out. The indications are very favorable that this ledge will prove permanent and widen out to greater extent as the work progresses. The miners employed by the Ballarat Company, in sinking down to bedrock under the cement formation in the old Chinese hydraulic claim, Spring Gulch, just north of Yreka boundary line, have been unable to do much work the past week, in consequence of a break-down in machinery, a piece of which had to be sent to San Francisco for repair. They were getting along nicely and expected to strike bedrock in a short time, if the great rush of water had been kept out, which can only be done by means of a powerful steam pump. As soon as the important piece arrives operations will be started day and night until down to the bottom of the gravel bed, as the gold naturally works down to solid foundation in gravel and clay formation.

HYDRAULIC.—The placer and hydraulic miners seem to be quite busy in all the mining camps at present, on account of the water being plentiful by the melting of the snow on the summits of the mountains, and considerable gold dust is being brought into Yreka and other towns, to be sold or shipped below. At Klamath river great preparations are in progress for working several new claims during the coming summer in addition to the old claims, and the income promises to be far ahead of any previous season. Dams are being fixed up and wheels put in for hoisting gravel and raising water for sluices, and some are already in running order. The English company's force of workers to develop the Campbell hydraulic mine in Quartz Valley, is expected to arrive in this county next month, when work at that rich and extensive mine will be commenced on a much larger scale, to result in the taking out of an immense quantity of the glittering dust, as there is an unusually large supply of water this season for a long run.

Trinity.

JUNCTION CITY.—Correspondence Trinity Journal, April 2: The winter, so far as miners are concerned, is a failure; the supply of water is limited, and the outlook for much more is very dubious. The only mine that runs steadily night and day is the Hayes Red Hill mine, the supply of water being derived from Canyon creek. There are at present 43 men on the pay roll. The superintendent has reopened the Old Keno mine. The amount of bullion from this precinct will no doubt be greatly increased, as that mine has been lying idle for several years and was one of the best paying properties in the district.

Tuolumne.

SUMMERSVILLE.—Correspondence Tuolumne Independent, April 1: The New Albany mine, which has been the property of deceased Dr. Walker, is now undergoing vast improvement, notwithstanding that this mine has been running at full blast for several months. Recently Superintendent Fitch of Sonora has added many new buildings and in connection with the same are a new Dodd wheel, rock crusher, ore bins, etc. A large force of men is pushing the work forward with the greatest alacrity and the energetic and enterprising foreman, Mr. Long, anticipates large returns and considers the mine valuable property. The Dead Horse mine still holds its own, and is in excellent working order and is reported to bid success to the company. The rock is reported fine and no doubt the amount of bullion unearthed will prove immense. The Carlotta mine, under the supervision of Mr. Symon, is in active operation, the development of which will increase the mining industry and general prosperity of our little burg. Mr. C. H. Thomas, superintendent of the Dead Horse, is recovering from an accident which he sustained several months ago.

Yuba.

TO DEVELOP A PROMISING MINE.—Grass Valley Tidings, March 24: A party of Grass Valleyans comprising Enoch Rowe, Frank Johns, Stephen Harvey, E. Andrews, W. G. Lord, John George, James Buckett and James Rodda have returned from Brown's valley, Yuba county, where they inspected a quartz mine owned by Hibbert & Burris. There are about 150 tons of ore on the dump, numberless pieces of which show gold very freely indeed, as specimens of the ore brought home bear witness to. The shaft on the claim is 120 feet deep and there is a drift seventy feet on the ledge, which averages a foot in width. But there is no quartz mill nearer than Grass Valley and the owners have not the capital to build one. The Grass Valleyans, all of whom are practical miners, made a thorough inspection of the property and are convinced that it is a good thing. They have arranged for a working bond of the claim, and will invite half a dozen friends to join them in the enterprise and will put a mill on the ground and systematically develop the property. It looks like a paying proposition from the start. There is a light hoisting and pumping plant on the shaft.

NEVADA.

Washoe District.

CONS. CALIFORNIA AND VIRGINIA.—Virginia Chronicle, April 2: There has been extracted from all parts of the mine during the week 1136 780-2000 tons of ore, 149 110-2000 tons of which was shipped to the Morgan mill, and 937 670-2000 tons to the Eureka mill. The average value of all of the ore worked at the Morgan mill during the week, 800 tons, was \$25.30. The Morgan mill has stopped and cleaned up, and the Eureka mill began crushing April 1. Bullion shipped to the Carson mint, assay value about \$19,331.31. Bullion now on hand in assay office, about \$24,500.

MEXICAN.—On the 1465 level the south drift from

the crosscut running east from the bottom of the winze 32 feet east from the winze, has been advanced 22 feet; total 34 feet, continuing in porphyry with quartz of low assay value.

UNION CON.—On the 900 level the joint Sierra Nevada and Union Con. west drift from the shaft has been extended during the week 20 feet; total distance west from the shaft 1800 feet. The face is in porphyry.

SIERRA NEVADA.—The joint Sierra Nevada and Union west drift, 900 level, is out west of shaft 1800 feet; face in porphyry.

GOULD & CURRY.—On the Sutro tunnel level the joint north drift with the Savage company was advanced 25 feet; total length, 304 feet; face in porphyry.

HALE & NORCROSS.—From the north drift above the 900 level on our north line a new east crosscut has been started and advanced 15 feet; face in quartz showing some pay ore. On the 900 level have started a winze 30 feet south of our north line to connect with the north stope on the 1100 level. The winze is down 10 feet; the bottom is all quartz, but shows no value yet. On the 1100 level have opened a new stope 40 feet west of the shaft which is yielding fair grade ore. North stope continues to yield the usual quality and quantity of ore. During the week have shipped to Brunswick mill 442 560-2000 tons of ore. Average battery assay \$15.

CHOLLAR.—At a point 150 feet south of north line, 1640 level, started an east crosscut, which is now out 10 feet; face in porphyry.

OCCIDENTAL.—The winze from west crosscut in the south drift, 350 level, is down 39 feet; continues in ore of fair grade. The crosscut on the 400 level, started to meet the winze sunk from the 350 level, is in 45 feet and is showing streaks of pay ore. The south drift, 450 level, is in 37 feet and continues in pay ore. The crosscut from the north drift, 750 level, has reached the foot wall.

SAVAGE.—During the week we have hoisted 729 cars of ore from the 750, 950, 1150 and 1400 levels, and shipped to the Nevada mill 527 tons; milled, 525 tons; average battery assay, \$19.45. Bullion yield for the week, \$7,816. On the 1500 level the upraise started from the main north drift at a point 80 feet north of our south boundary, is advanced 47 feet, being carried up 20 feet during the week. On the Sutro Tunnel level the joint west drift with the Gould & Curry company was advanced 30 feet, making its total 279 feet; face in porphyry and clay.

BELCHER.—The north drift, 300 level, is now out a total distance of 191 feet from No. 2 raise. For the past 23 feet it has followed a streak of good ore ranging in width from 10 inches to 3 feet. The streak is still in sight in the face of the drift near the bottom, where it is 10 inches wide.

CROWN POINT.—Have resumed work in the main west crosscut, 600 level, which is now out 450 feet; face in hard porphyry.

YELLOW JACKET.—Shipping to the Brunswick mill 30 tons of ore daily. The usual prospecting is being done.

Ferguson District.

NEW GOLD FIND.—Cor. Pioche Record, March 26: The new gold find is being worked by two or three miners, and is yielding to the satisfaction of any reasonable person, and since the new assay office has been put in running order, it proves that the wildest anticipations were not overdrawn. On opening the lode, it is found that a cross ledge runs across the first found ledge, that is as rich in horn silver and gold as the first. There are no disconnections among those that came here early and got claims and went to work; but some come here, look around for a few hours, and because they can't find a claim adjoining the discovery claim, they turn their back and start. Yet one man from Pioche did come here last week and located a claim within 600 feet of the Monkey Wrench, and showed your correspondent some very promising indications; and among others was a ledge of rock 30 to 40 feet wide, which carries from \$6 to \$12 in gold. I must repeat that the Ferguson is among the fixed and rich places in Nevada, and will probably step to the front in Lincoln county.

Tuscarora District.

NAVAJO.—Times-Review, April 1: No. 2 winze, 350-foot level, has been extended 8 feet, still showing a little good ore. No change elsewhere.

BELLE ISLE.—The crosscut from No. 1, 350-foot level, extended 15 feet. Crosscut from No. 3, same level, extended 22 feet.

NORTH BELLE ISLE.—The crosscut from the north end of the south 400-foot level extended 12 feet, cutting several small seams giving good assays. North intermediate above the 500-foot level extended 17 feet. South intermediate from same winze extended 13 feet, vein small but the ore is of good grade. No. 4 north drift, south 500-foot level, extended 16 feet, giving better assays.

NORTH COMMONWEALTH.—Second level—Foot-wall raise has been extended 26 feet on the vein, small seam of ore.

DEL MONTE.—Second level—No. 4 raise has been put up 27 feet, vein shows some mineral, but of no value. Third level—No. 1 raise has been extended 24 feet, exposing some low grade ore.

NEVADA QUEEN.—Second level—No. 1 south drift has been advanced 30 feet; No. 1 east crosscut extended 25 feet. Third level—No. 1 stope are looking well, produced 6 cars first and 10 second class ore, \$300 and \$37 per ton. Going east the stope will reach No. 2 raise the coming week, when No. 2 stope will be started and extended along the level to No. 3 raise, where good ore is exposed by the raise. Will not start stope from second level until after connection is made with the shaft.

Montgomery District.

TO RESUME.—Pioche Record, March 26: Montgomery district, just beyond our southwest boundary line, and which created such an excitement among mining men generally only last summer, and lately reported as a "buried El Dorado," will shortly come to the front again. There is merit in the claims discovered there, though the rock is not so "lousy" with free gold as the general reports of the place throughout the country indicated when operations first began. The rock contains free gold, and in great quantities than many a paying gold claim in other parts of the mining country, but the remoteness of the place from all transportation facilities, lying as it does in the midst of a vast desert country, and every needful thing being consequently high in price, the extravagant first management of Montgomery, the discoverer, promised to bankrupt his backers. From a gentleman who has just returned from

the place, we learn that Montgomery has disposed of his interest in the claims to the San Francisco parties, Woodward and others, who furnished the capital for the first working, and that these parties were daily expected on the ground last week, at the time our informant was there. It is the intention of the new owners to resume operations, and on a scale larger than before; and the erection of an additional Huntington mill or two is contemplated. The mines lie only 18 miles from the Fahrump ranch, in a northwesterly direction, and already a number of men are in the vicinity awaiting the opening work. The geographical condition of the country is such that the outlet is to the southward, and Dagget, on the A. & P. railroad will continue to be the general shipping point.

ARIZONA.

AT LYNX CREEK.—Prescott Courier, April 2: W. B. Jones, of the P. & A. C. R'y, has purchased one-half interest in the Sunrise mine, on Lynx creek, from Frank Kuhne. This property was known as the old King mine, when it belonged to James King, who died last December. There is a 50-foot shaft on the mine, which will be sunk to a depth of 100 feet in the near future. The pay streak is two feet wide, ore from which assays 155 ounces of silver to the ton. The property is thirteen miles from Prescott and adjoins J. M. W. Moore's Amulet mine. Mr. H. Yarnell came by way of the Yarnell mine recently, on his trip from his residence in Phoenix in this city. Says he found everything rushing at the Yarnell, and thinks the new mill will start about April 4th. Besides immense quantities of medium grade ore, this mine also has ore which is as rich, perhaps, as any ever found in the Territory. Before us lies a specimen weighing about four ounces which seems to be composed of equal parts of quartz and gold. This property might properly be called a gold quarry, as churn drills are used in breaking ground. It is estimated that the ore can be mined and milled for \$2 per ton, and that there is enough free ore to keep the 25-stamp mill running for a century.

BRITISH COLUMBIA.

WORKING.—Nelson Miner, March 22: Frank Fitch, who along with his partners Jack O'Neil and John Fritz, has been doing development work on the President, a claim on Duck creek, reports a tunnel in 65 feet. While the tunnel is not on the main ledge, it has been in ore all the way. He expects to strike the main body in about another 50 feet. T. C. Wells, who has been at work on the Tam O'Shanter, a claim on the east side of the lake, reports that property looking fine. The tunnel is in about 140 feet on the ledge, which shows a 5-inch streak of ruby silver that gives high assays. The ledge is well defined and carries a good grade of ore its entire width. Owing to the breakage of the pump, work was suspended on the United mine at Ainsworth. Work has also been suspended on the Neosho, owing to the inflow of water. The shaft was sunk 100 feet by windlass, and the water cannot now be handled without machinery. Superintendent Wallace goes to Seattle to consult the owners of the property. Pending letting a contract to sink the shaft another 100 feet, all work other than keeping the pumps running has been suspended on the Krao. Everything is running along smoothly at the Tenderfoot and the Skyline.

DAKOTA.

ORE SHIPMENTS.—Deadwood Pioneer, April 2: The first ore from the Welcome mine was shipped through the city yesterday. It will be taken to Rapid and treated at the chlorination works of the company at that city. Several cars of ore were also brought down from the Boschahel, to be treated at the Golden Reward works. The D. C. brought down a total of 24 carloads of 240 tons, part of which came from the Golden Reward and the remainder from the Maggie. The latter ore is taken to the D. & D. smelter. Total shipment yesterday from Bald Mountain aggregated about 350 tons.

MCGEE DAEGHLIN PLANT.—The crushers and other machinery at this plant are now running. No precipitation has yet been done, and probably none will be for some days to come. The machinery all works smoothly, and there is no doubt that the system will prove an effective and economical method of treating our ores.

MONTANA.

STRUCK THE VEIN.—Phillipsburg Mail, March 24: The striking of the vein in the Bi-Metallic Extension by the diamond drill has been the animating topic of conversation among the people of Phillipsburg, Granite and vicinity for the past few days. That the Extension people would eventually come in contact with the great vein has been the firm belief of a large number of people who took the trouble to look into the matter and study the topography of the country as well as the relative location of the Bi-Metallic Extension properties to those of the two great mines famous in the history of the world's silver producers—the Granite and Bi-Metallic. Rumors of strikes has been made several times recently, but the management of the company has not in-dorsed or verified them in the least until the occurrence of the one announced last week. The first strike was made last week by the diamond drill in the north crosscut on the 450-foot level. When in a distance of about sixty feet from the face of this north crosscut the diamond drill encountered the ore vein which those in a position to know say is very extensive. It is asserted positively that it is over fourteen feet in width, though some claim its width to be greater than these figures. While running through the ore matter the drill encountered a small stringer of granite, and for a time it was thought the body would hardly exceed five feet in width, but when it was determined that after running about a foot farther ore matter was again being run through, the hopes of the management began to rise, and have continued to ever since. The drill was kept working and after passing through this body, and at a distance of about ninety feet from where the boring was commenced, another vein was discovered. The figures in this case are given at eight feet. There is no question now but that the Extension possesses two big leads, the extent of either being sufficient to assure a good paying mine provided the ore is rich enough in quality and the pay-streak reasonably extensive.

LOWER CALIFORNIA.

COPPER.—Yuma Sentinel, March 23: The Boleo Copper Mining Co. work 20 mines and employ 1300 men, of which 900 are regular miners. Twenty-eight miles of railroad connect the different mines with each other. They turned out 460 tons of copper in December and 475 tons in January. The San Juan mines, owned by Cranz Bros., 40 miles north, employ 475 miners and turn out from \$40,000 to \$80,000 in gold per month. The force will soon be increased to 700 men. This speaks well for the Lower California mines.

AT ALAMO.—Lower Californian, March 25: The Aurora mill recommenced running a week ago on rock from the Aurora said to be as rich as any ever taken out. The Borracho mine, belonging to the Aurora Co., is being provided with hoisting works, ore bins, blacksmith shop, etc., and regular development has begun. The shaft is something over 90 feet deep. The stringer in Aurora ground, over the line from the Richmond, is richer than ever. The Princessa mill will soon start. The new vein in the Princessa is rich and of the same character of quartz as the Aurora. The Tomasso Co., has put on eight hour shifts and is steadily sinking. Ground is being broken for the hoisting works, pumps, etc., all of which will be run by electricity. The dynamo will be stationed at the foot of Tomasso hill in the vicinity of the El Paso mill. John Allbright is in Alamo with a party who is looking into the Montezuma mine and mill with a view of purchasing. The mine is promising and should never have lain idle so long. La Flor Co. is getting a lot of rock ahead to make a long run. Capt. Selby runs his Manzanita mill steadily on custom rock.

NEW MEXICO.

MILL.—Southwest Sentinel, March 31: A mill will be erected by the purchasers of the Maud S. mine at Silver Creek this summer. The contract for the lumber to be used in the mill has already been let. Work has been resumed on the Colchis mill below town, and will be continued until the mill is completed. Carpenters commenced work there yesterday. Another shipment of copper bullion will be made from Anson S. smelter in a few days. The Anson S. smelter is producing more copper than any other in the Territory. At a depth of 12 feet, in La Solidad mine, on the east side of the Florida mountains, a strong lead of high-grade ore has been found. It assays over 100 ounces in silver and about 50 per cent lead. Twelve thousand tons of ore are in sight in the Surprise mine at Cook's Peak, and the workings are still in ore. The carbonate strike recently made there is of much greater extent than the owners of the mine expected it would be. Some very fine ore is now being taken out of the Jim Crow mine in the Piedmont district, which will probably be shipped to California, if satisfactory rates can be obtained from the Southern Pacific Company, and the New Mexico and Arizona Company. Some fine specimens of gold, silver and copper ore were brought into town yesterday by a prospector, who says he took them from a claim which he is opening about ten miles from Carlisle. The deal for the Maud S. mine on Silver Creek, which has been pending for some time, has been closed, and the parties will immediately commence the construction of a tramway from the mine. The 35 tons of ore from the St. Helena mine, in the Central district, which was treated in the Bremen mill here, ran about \$14 per ton, and there are large quantities of ore in sight. M. W. N. F. is now engaged in developing five copper mines on Copper Flat, between Central and Ansonito. Deeds were recently put in escrow for these mines by J. H. Bragaw and Andy Johnson. Some very fine copper ore has been taken out of the mines. A strike was made by Bennett & Hill in a claim north of the Grand Central and Texas, in the Central district, last week, which promises to be a very important one. Some of the ore was brought over here for assay and ran \$765 in silver and \$2 in gold per ton. The ore was not very rich on the surface, but as soon as water level was reached, at a depth of about 25 feet, the character of the ore changed completely.

OREGON.

A MILL.—Ashland Tidings, March 23: Archibald Taylor is putting up a mill at the Griffin mine in Slate Creek precinct, Josephine county. Charles and L. C. Bayse have struck a rich and most promising quartz ledge, averaging over two feet in width and assaying \$72 per ton. An extension of Lucky Bart's mine on the Sardine creek divide was last week struck by Menden & Eaton, who think they have as rich a ledge as the original strike. William Bybee has leased his mines on Canyon creek, Josephine county, to O. F. Bussett, while S. F. Fielder is in charge of his claim some distance from Grant's Pass. Among the discoveries in the mining line reported lately are those of a fine ledge by Hardin & Co. on the hill facing the old Centennial diggings, from which a considerable amount of gold has already been taken, the first pocket tapped yielding rich ore. Enoch Roten has also made another of his pocket finds, from which he took about \$250 in one day. Flanagan & Moody of the Messenger mine on Applegate, Jewett & Co., who own the Banket and old Jewett ledges near Grant's Pass, and other Josephine county miners are shipping their concentrates to the Linnton smelter near Portland.

THE PATTON.—Jacksonville Times, March 25: The extensive operations of the Ashland Mining Co. at the Patton ledge in Talent precinct have been so important of late that a write-up in the Ashland papers has been considered proper. It appears as if the company have discovered a mine of equal importance to some of the famous Nevada ledges. The body of ore is so extensive, and the assays have been so favorable as the work progressed, that the company is now satisfied that it will pay them to put up a mill and employ a large force in developing the mine to the utmost during the next year.

ASHLAND.—Tidings, April 1: Superintendent Wilson, of the Ashland Mining Company, is preparing to build a wagon road from the end of the road near B. F. Wagner's place up to the mine. At present, everything hauled to the mine has to be taken around by way of Talent and up Wagner creek, about 12 miles, while a road from the Wagner creek canyon road to the mine makes the distance only about 3 miles from Ashland.

MECHANICAL PROGRESS.

Development of Marine Engines.

Prof. Henry Dyer contributes to the *Scottish Review* a very interesting article, in which he traces the development of steam ships and their machinery. The great improvements which have taken place may be roughly indicated by the amount of coal consumed per indicated horse power per hour. Until about 1830 the boiler pressure seldom exceeded three pounds on the square inch above that of the atmosphere. From that date a gradual increase took place, and in 1845 the average was about 10 pounds per square inch. By 1850 it had reached 15 pounds. In 1856 Randolph, Elder & Co. employed pressures of 30 pounds in their compound engines, but it was not till almost ten years later that such pressures became general in the merchant service. On the compound engine becoming common, pressures suddenly rose to 60 pounds, and in some cases to 80 pounds and 100 pounds per square inch, and now for triple expansion engines the average is over 150 pounds, while for quadruple expansion engines it is 200 per square inch. With regard to coal consumption, the earliest marine engines must have used very nearly 10 pounds per indicated horse power per hour. In the well-known side-lever engines it was about 7 pounds, while for engines in use before the general introduction of the compound type 4 pounds to 4½ pounds was the average. Randolph, Elder & Co., with their compound engines, had an average of from 2½ to 3 pounds. In 1872, when the compound engine had been in use for some years, the average was found to be 2.11 pounds, being a saving of nearly 50 per cent over the ordinary engines, while in 1881 there was a reduction to 1.828 pounds, or a further saving of 13.37 per cent. With triple and quadruple expansion engines there has been a still further reduction of about 25 per cent, the consumption in some of those engines being as low as 1½ or 1¾ pounds per indicated horse power per hour.

Prof. Dyer traces the development of the size of steamships from the Great Western up to the present date. The latest development of the Atlantic race shows a close approximation between the best steamers of the White Star, the Inman and the Cunard lines, there being only a difference of a few hours in favor of the order in which their names are given, the fastest passages of each varying from 5 days 16 hours 31 minutes to 6 days, 2 hours 31 minutes.

Why Good Mechanics are Scarce.

The question why boys do not properly and thoroughly learn a trade in these days has been partly answered by an old employer, who says that boys nowadays are different from what they were when he was a boy. In the good old times they came to learn as much as possible, now to earn all the money they can. Then, apprentices were the children of comparatively well-to-do people, who took pains to bring their children up properly, and were more solicitous, by having their sons properly instructed and by making good mechanics of them, to make them independent of the world. Now, apprentices come mostly from the poorer classes, and are expected to bring as much wages home as possible, so as to help support the family. They only look for the immediate present, regardless of the future. The first question an apprentice asks is how much he is to get a week; he thinks only of his earning capacity, and not of the time it takes to instruct him, nor of the materials he spoils. The next question generally is what hours he will have to work.

The result is that employers now endeavor only to get as much work out of boys as they can, and take no interest in teaching them anything—in fact, boys in workshops, nowadays, are looked upon as so many necessary evils. When the employer ceases to be looked upon and respected as a teacher and educator, and only as an employer, there is an end of any hope for the proper instruction of boys in any mechanical trade. Times have changed, and with them old methods have passed away. We doubt very much if the newer methods are really an improvement. Time will tell.—The Leather Manufacturer.

LARGE HYDRAULIC RIVETING MACHINES.—Two immense hydraulic riveting machines, constructed by the Chester Foundry and Machine Co., have been supplied to the United States Navy Yards at Brooklyn and Boston. The machines are, it is said, the most powerful ever built, and are intended for a working pressure of 1500 pounds to the square inch. They are to

drive rivets up to 1½ inch diameter, with a pressure of 125 tons on the rivet, and a pressure of 25 tons on the plates to hold them together while the rivet is being driven. The machines are 10 feet 6 inches in the throat, and are capable of making the heaviest marine boilers with steel plates varying from ¾ to 1½ inch thick, and up to 16 feet diameter. Boilers up to 30 feet long could be made without any inconvenience. The features of the machine are the extreme simplicity in repacking or for repairs, the internal mechanism being such that it can all be taken apart or put together again in three hours, and the process of repacking can be done in the space of 45 minutes. The cranes over the machine lift 30 tons, and are arranged to lift this weight by a water pressure of 1500 pounds, and the transverse and trolley movements are by hand, and are arranged for handling the boilers to be riveted from the platform of the riveting machines.

Straightening Tempered Steel.

It is well known that files are not usually drawn after being hardened, and that the hardening frequently springs them out of line. But, notwithstanding that, the files are made as hard as they can be by heat and cold water; they are readily straightened after being hardened. This operation is performed at once, as soon as the files have been dipped. The files are taken from the bath of melted lead and chilled while red-hot in a tank of running water. This immersion, for the instant, hardens only the surfaces, while the interior is soft and pliant with heat. At this time the file may be straightened by bending over and under bars. By similar means, crooks in steel arbors, reamers and other long tools may be removed, even after they have been hardened and tempered. A cast-steel saw arbor had received an offset or crook in the journal at one end, just inside the shoulder. The crook was at the worst end, that next the saw, and, although scarcely perceptible to the eye when the arbor was turned on its centers, it was sufficient when the arbor was in the boxes to throw the periphery of a two-foot saw considerably out. The arbor at the bearing part, was very gradually heated, not enough to change color, but a "black heat." A V-shaped block was placed in a vise bearing against the offset side of the journal, and the vise screwed up. At a third trial the arbor came out perfectly true. A contemporary says a tempered reamer was straightened in the same way, the point at which it was crooked being heated by an alcohol lamp. The heat was sufficient to allow the steel to give, but not enough to start to temper. Steel that has a blue temper only may be straightened by blows with a pene hammer on a smooth, clean anvil, the face of which should be warmed enough to remove the chill.—Horseshoers' Journal.

The Best Alloy for Bearings.

Dr. Chas. B. Dudley describes in the *Engineering News* the experiments which have been made on the Pennsylvania railroad, in the search for the best alloy for car-bearings. The alloy which has been adopted is a bronze containing copper, tin and lead, in the proportions of 77, 8 and 15. Extensive experiments have shown that its rate of wear, as compared with the old-fashioned bronze containing 7 parts of copper to 10 of tin, is as 58 to 100, and it is stated to give no more trouble by heating. It has also been tested in comparison with some of the best of the patented bronzes, and showed somewhat superior results, as elsewhere abstracted. Its tensile strength is rather low, only 24,000 pounds, but it is designed for a bearing metal only, and, so far as we know, has not been tested except in the journal bearings of railway rolling stock. The cost of this metal at present market prices is about 10½ cents per pound, whereas the cost of the old-fashioned 7 to 1 bronze is about 11½ cents per pound, and some of the patented bearing metals, on which many engineers are accustomed to rely, are sold at prices far above this figure. A pertinent question in regard to this alloy is whether it wears the journals faster than other metals. No experiments on this point have been made, but it is probable that any notable difference in this respect would have been discovered, since the new alloy has now been in use some time. It is practically certain that there is considerable difference in bearing metals, with respect to wear on the journals; but the laws which govern this variation, so far as we know, are still undetermined.

FAST LOCOMOTIVE-ENGINE BUILDING.—The Baldwin Locomotive Works of Philadelphia claims to hold the record for rapid

locomotive-building. An order was received on January 20th from the St. Louis Merchants' Bridge Co. for four large engines, and on January 25th the engines were finished and ready for shipment. Between the date of filing the order and its completion a Sunday intervened, so that the actual time consumed was only four days, or one day for each engine. The boilers used in the engines were not quite completed when the order arrived, but the work was rapidly pushed forward. One day was consumed in fitting these boilers with water purifiers, and this work had to be done before the flues could be constructed.

THE NEW DISCOVERY IN IRON-MAKING. We are enabled to present our readers with a few further particulars of the electro-metallurgical process which, according to the German experts who have tested the method, is to revolutionize the metal industry. The *Dusseldorfer Zeitung*, a most reliable journal, has published a further long article in which it refers to the incredulity with which its previous statement has in many quarters been received, and remarks that doubts will in due time be dispelled. Not only iron, but also other metals, such as gold, silver, copper and aluminum, can be extracted from their ores by the new and infinitely cheaper method. When it is considered, it continues, that the current generated by a dynamo driven by a small gas or petroleum engine will be capable of extracting dry for day more metal than the largest blast furnace is able to produce, some idea may be formed of the radical changes which are likely to be the result of the employment of the new process. The invention, which is more rightly described as an electro-technical discovery, was perfected three months ago. The inventor has succeeded in devising a practical process which has secured the ready support of a number of well-known American and German capitalists, who purpose forming a gigantic international syndicate. The statement as to the saving of 80 per cent on the present blast furnace method is said to be no exaggeration. The names of the inventor and his supporters are to be made known to the world as soon as the letters patents have been granted.—*Manufacturers' Gazette*.

SCIENTIFIC PROGRESS.

Fuel Gas Value.

Dr. E. G. Love, in the *School of Mines Quarterly*, notes that the promoters of the various schemes for the manufacture and distribution of fuel gas have directed their attention more to the production of a gas which can be sold at a very moderate price, while in many cases at least they have overlooked the fact that the product they propose to sell must be judged primarily by its efficiency as a heating agent. A fuel gas at 25 cents per 1000 feet is no cheaper than another having four times its calorific power at \$1 per 1000; and yet very many consumers will take the first as a much better bargain. It is of the first importance that any fuel gas intended for general distribution should have a decided odor, in order that its admixture with the air may be readily detected. Experience has shown the wisdom of this requirement. Beyond this, its valuation should be arrived at on the same basis as in the case of an illuminating gas, that is, the number of heat units which can be obtained for a given cost.

In considering the extent to which the present supply of illuminating gas can be made to answer the purpose of a fuel gas, Mr. Love holds that the only question is one of cost, as it possesses a characteristic odor and its distribution is already effected. The following are results obtained by him in practical calorimetric tests of the carbureted water gas made by the Municipal Branch of the Consolidated Co. of New York. The tests were made from time to time during the past two years, and the figures give the heat units per cubic foot at 60° F. and 30 inches pressure: 715, 692, 725, 732, 691, 738, 735, 703, 734, 730, 731, 727; average, 721 heat units. Similar tests of mixtures of coal and water gases made by other branches of the same company give 694, 715, 684, 692, 727, 665, 695 and 686 heat units per foot, or an average of 694.7. The average of all these tests was 710.5 heat units, and this, for our present purpose, we may fairly take as representing the calorific power of the illuminating gas of New York. One thousand feet of this gas, costing \$1.25, would therefore yield 710,500 heat units, which would be equivalent to 568,400 heat units for \$1.

The common coal gas of London, with

an illuminating power of 16 to 17 candles, has a calorific power of about 668 units per foot, and costs from 60 to 70 cents per 1000. A large number of fuel gases tested gave from 184 to 470 heat units per foot, with an average of 309 units. The price charged for the gas, however, was in some cases unknown, although presumably as low as 50 cents per 1000.

Some companies have adopted the plan of selling gas, to be used for fuel purposes, at a somewhat lower rate than that for lighting, and in this way are encouraging its use. Of 362 gas companies in the United States, 165, or over 45 per cent, give some reduction to consumers using illuminating gas for fuel purposes. This discount varies from 5 per cent to over 60 per cent on the price charged for the gas used for lighting. Eighty-one companies have a reduction of 25 per cent or more, while the average discount is a little over 24 per cent. From these facts it is argued that the advantages of utilizing our present supply of illuminating gas for fuel purposes are very great, and perhaps sufficient to warrant the prediction that with a cheapening of the cost of production, etc., encouraged by State and municipal control, the illuminating gas will be made to answer the double purpose of lighting and heating.

RAINFALL AND POPULATION.—The distribution of population relative to mean annual rainfall indicates not only the tendency of people to seek arable lands, but their condition as to general healthfulness, says Carroll D. Wright in the *Popular Science Monthly*. The average annual rainfall in this country is 29.6 in., but the variations range from zero to perhaps 125 in. Gauging the distribution of the population in accordance with the annual average rainfall in different localities, some interesting points are observable, not only as to the number of inhabitants in the areas calculated, but as to the density of population. The greater proportion of the people of the United States are living in the regions in which the annual rainfall is between 30 and 50 inches. It is calculated that about three-fourths of the inhabitants of the country are found under these conditions; and, further, that as the rainfall increases or diminishes, the population diminishes rapidly. The density of population in regions where the average rainfall is between 30 and 40 in. is 43.1 per square mile; in regions where it is from 40 to 50 in. annually, the density is 59 per square mile; in regions where the rainfall is from 50 to 60 in. annually, the density is 25.1, and in the arid regions of the West, where the rainfall is less than 20 in., being two-fifths of the entire area of the country, less than three per cent of the population finds its home. The population has increased rapidly in the regions having from 30 to 40 in. average annual rainfall.

THE SOLUBILITY OF METALS.—The insolubility of pure metals in acids has been investigated by Dr. Weeren, a German chemist, who states that chemically pure zinc, as well as many other metals in a state of purity, are insoluble, or only very slightly soluble in acids, because at the moment of their introduction into the acid they become surrounded by an atmosphere of condensed hydrogen, which, under normal circumstances, effectually protects the metal from further attacks on the part of the acid. In the experiments which established this conclusion, the amount of chemically pure zinc dissolved by the acid was first determined; it was next sought to ascertain what difference would follow by performing the experiment in vacuo, when, of course, the escape of hydrogen would be greatly facilitated, and under these circumstances the solubility was found to be increased sevenfold. In the final experiment, namely, to learn the effect of introducing into the acid a small quantity of an oxidizing agent capable of converting the hydrogen film to water, it was found that when a little chromic acid was thus introduced, the solubility was increased 175 times, and when hydrogen peroxide was employed, the solubility was increased three hundredfold.

THAWING FROZEN EARTH.—A novel method of thawing frozen earth for making street excavations was described by H. H. Kelley, superintendent of the Waltham, Mass., Gas Works, in a paper read before the New England Association of Gas Engineers. Stone lime is spread several inches deep over the place where it is desired to excavate, and is thoroughly wetted and covered with straw. A piece of canvas or tarpaulin is spread over the heap, and it is left for 12 hours, more or less. In two cases in which Mr. Kelley has tried this method recently, frost 18 ins. to 26 ins. was removed from the ground. In ordinary cases, the expense of the lime would be too great to permit this plan to be adopted, but gas companies can use the lime afterward in their purifiers.

ELECTRICITY.

Causes for a Dynamo Failing to Start.

In the failure of a series wound dynamo to excite or yield a current, it may be inferred that the external portion of the circuit presents a very great resistance, which may be attributed to several causes.

If it be found that the armature circuits and insulation are in good condition, then the first place to look for the fault is in the brushes, which may not be properly adjusted to the commutator segments, and which, in turn, may be short-circuited to each other. There is a layer of insulating material placed between the commutator segments, which, if of such a substance as to readily absorb copper dust from the commutator, as asbestos fiber or wood, will in turn become conductive. Such substances should not be used.

In new dynamos, mica insulation of commutators is now used, so that this trouble very rarely occurs in them. In some dynamos, however, they are insulated by air-gaps only, and the spaces between them soon become covered with a paste of copper dust and oil, and a connection thereby established.

The loss of current in a dynamo is presumed by many people to be attributable to dirty contacts or simply oxidized brass contacts of brushes with their brackets at the terminals; such, however, is seldom or never the case, but it may so happen that, owing to carelessness, the brushes may become coated with a tough film of oil gum, resulting in imperfect contact with their slides.

As the fault of nonstarting may be wrongly laid to the dynamo, it is well, perhaps, to point out that imperfect contacts are likely to happen at fusible safety plugs, fixed for safety near the dynamo. These plugs are very often made of lead wire, pieces of which are placed near terminals. The use of lead wire is rarely satisfactory, it being almost impossible to secure good contact by its use with an ordinary binding terminal, because, if subjected to a pressure, it flattens out and is rapidly oxidized, finally burning out at the contact points. Where lead wire is used, it should be soldered into brass tubes, so that a hard surface may be afforded for a terminal screw.

Not having been able to locate the fault near the machine, it should be searched for in the external portion of the circuit, beyond switches and cut-outs. It can very readily be determined if the fault actually lies within the machine—that is, within its terminals—by short-circuiting it. The safest way of accomplishing this is to secure one end of a few yards of wire in one of the terminals, and bring the free end against the other for but an instant only. If the machine be excited, a bright flash will mark the breaking of the contact, and sparking will occur at the brushes during contact.—*Electrical Age*.

QUICK WORK.—The new mining camp of Creede, Colo., is attracting many miners from all parts of that State, and is rapidly building up. It already has an electric light plant, which was installed in the quickest time on record. The idea of equipping the plant was conceived at noon, Feb. 1st, by John W. Flintham, general manager of the Denver Consolidated Electric Light Company. Before the day was over, says the *Electrical World*, the Creede Electric Light and Power Company was organized and incorporated, supplies were ordered and placed aboard a special train of cars at Denver that had been chartered from the Denver & Rio Grande Railway Company, and everything necessary for the complete equipment of a model electric light plant for arc and incandescent lighting, by midnight of the same day, was on its way to the modern mining camp. Creede was in sight Tuesday night, Feb. 2d, and by day-break the following morning a gang of laborers was put to work breaking ground and getting the foundations of the power house ready. By this time the town was alive with interest in the work, and pool sellers were offering odds on the time to be occupied in completing the plant. The work progressed night and day, and the electric current was turned on at 11:15 p. m. Saturday, Feb. 6th. The actual time occupied in completing the plant, erecting the buildings and placing the machinery in position, was from Feb. 3d, 7 a. m., to Feb. 6th, 11:15 p. m., less than a week after the machinery was purchased in Denver, over 300 miles away, and this young town was given the latest luxury of civilization. The magnitude of the undertaking will be understood from the following inventory of the plant: Two boilers, 100 h. p. each; one Armstrong & Sims high speed engine 100 h. p.; one pump; one dynamo of 30 arc light; one 400 incandescent light dynamo

and two 50 foot iron smokestacks. Since the house was completed, another dynamo of 60 arc light capacity has been added, and the company will increase the capacity for incandescent lamps to 1000 as quickly as the machinery can be set.

Steam Engines for Electric Lighting.

An extremely interesting paper, read before the Electric Light Convention at Buffalo, was that of Mr. D. Ashworth on "The Allied Powers." Mr. Ashworth reviews the development of the steam engine to meet the requirements of electric lighting. As one stands by and observes the operation of the modern steam engine in its unvarying motion and its great power, the mind is naturally filled with thoughts of the vast amount of labor, time and skill represented by such a mechanical giant. The thought of the countless problems that have been solved and the thousands of difficulties that have been met and overcome in the development of such a machine is bewildering to the finite mind, but the result is a grand monument to the efforts of American students, scientists and mechanics. As perfect as steam engines are, however, there remains room for improvement. An engine running continuously, as is required in electric lighting, must be durable, and in this direction Mr. Ashworth states there is much to be done in the way of betterment. The tendency to multiplicity of parts or movements in valve gear is deplorable, he says. Complications eventually end in interruptions and break downs that frequently entail expenses of alarming proportions and culminate occasionally in an entire abandonment of the plant. Such disasters, of course, are ruinous, and Mr. Ashworth has pointed out the way in which efforts should be directed, with a view to their avoidance. There is no doubt that American ingenuity will solve this problem, as it has done in the case of all others, and experience, combined with scientific thought, will certainly triumph.

Field Magnets with Consequent Poles.

Many dynamo-electric machines are constructed on the consequent-pole principle, says the *Electrical Age*. If we take an iron ring without a break, with projections as pole-pieces, it will be practical, by means of proper winding of the wire on the field-cores, to concentrate the magnetic poles at the two opposite points, known as the pole-pieces.

The ring really, then, consists of two electro-magnets, with their like poles together. This arrangement gives rise to what has been termed consequent poles. An electro-magnet, with consequent poles, was first applied to dynamos by Gramme, who embodied this construction in his constant-current machine as early as 1870.

Consequent-pole field magnets were very commonly used in dynamos until the investigations of Hopkinson and others revealed the fact that this construction generally involved considerable avoidable loss of energy. As commonly carried out, the design embraces a considerable length of magnetic circuit, as it includes—in the Gramme dynamo—the end-frames of the machine. In addition to the extension of the circuit, this form of magnet commonly involves a considerable number of joints—always a weakening feature in field magnets. Experience proves that, although this combined form of field magnet presents many advantages from a constructive point of view, they are more than counterbalanced by the drawbacks already mentioned. An ideal field magnet would have the shortest possible circuit, the greatest possible sectional area, consist of the softest possible iron, and be entirely free from joints.

ELECTRICITY IN A BELGIAN MINE.—The extensive application of electricity to mining work in some parts of Europe is notably illustrated in the case of a lead mine in Metternich, Belgium. *La Lumiere Electrique* says of this mine that not only is it equipped with an electric light plant, but the current is utilized in every department of the work. The output of mineral reaches about 3000 tons per day, and so numerous are the applications of automatic electrical machinery that 25 men is found to be a sufficient force to handle all the work. One of the most novel uses to which the current is applied is an automatic arrangement which registers the delivery of every load at the shaft. Each load, on arriving, establishes a contact which completes a circuit through the office of the works. This circuit operating on an electro-magnet marks a blue line on a band of paper which turns by the movement of a clock. By this means, the regularity of the work and the number of loads delivered is recorded with an accuracy which admits of no dispute.

GOOD HEALTH.

Artificial Light and the Eyes.

Medical men consider that forced and undue recourse to artificial light must have a permanently deleterious effect on the eyes. Eye defects are, it is said, unusually prevalent. Oculists testify to an immense increase in their practice during the last quarter; on the other hand, however, we hear of no abnormal demand for spectacles. The best artificial light for the eyes, says the *Optician*, is a subject that should prove of interest to all classes. It has been dealt with very fully by Mr. Gustavus Hartridge, who deems it essential that a good artificial light should have the following qualities, in order that it may have no injurious effects upon our eyes: 1. It should be of sufficient intensity to produce a good illumination, while it is important that no direct rays shall fall upon the eyes; for in the case of a very strong light such as the arc, if the unprotected light be exposed to it for any length of time, congestion of the eyes, with spasm of the pupil and considerable temporary exhaustion of the retina will take place, and will make itself evident by great dazzling and obscurations of the vision, together with swelling of the eyelids; while in some cases serious injury has been inflicted on the retina, and permanent loss of central vision has occurred. This result may occur from exposure of the eyes to any very intense illumination, and even gazing at the sun has produced the same permanent injury in a few cases. 2. That the light should be absolutely steady and of constant quantity; nothing is more fatiguing to the eyes than the constant flickering which occurs with many gas lights and with unprotected candles. The interruptions which are so liable to occur in the "arc" light is one of its great disadvantages, while the incandescent light has been, by improved mechanical arrangements, rendered nearly absolutely steady. 3. As little heat should be generated by the illuminator as possible, the oxygen contained in the air should not be used up, and the products of combustion should be reduced to a minimum, since heat and the products of combustion are extremely irritating to many eyes. These conditions, Mr. Hartridge considers, are most nearly fulfilled by the incandescent electric light, since it contains only a small amount of irritating rays, is fairly steady, gives off but little heat and no products of combustion, while at the same time the oxygen is not consumed. The difficulties at present are in placing the light in such a position, and in shading them in such a manner, that no direct rays can fall on the eyes; experience alone can overcome this difficulty. The point always to be aimed at is to arrange the light in accordance with the requirements of the room; a system of lights intended to illuminate equally a whole room cannot be expected to be the best illumination for special purposes, such as reading and writing. When the light is required for reading or writing, it should be conveniently placed so as to throw the rays on the book by means of a suitable shade. The light should, in all cases, be subdued. The present mode of hanging the incandescent light with a small porcelain saucer shaped shade above, though probably economical as regards the illumination, is decidedly objectionable. It must be conceded that the electric light, judiciously placed, and carefully shaded, has advantages not possessed by any other artificial illumination. Not only is it the best light for strong and healthy eyes, but even those eyes that are unduly sensitive or the victims of disease may work longer, and with less risk and discomfort, than with gas, oil or candles.

TREATMENT OF INFLUENZA.—Cyrus Edson of the Health Department of the City of New York, publishes a monograph on la grippe and its treatment (D. Appleton & Co.). Three indications are to be fulfilled: 1, means must be taken to assist the system to rid itself of the poison to which the attack is due; 2, pain must be relieved, and 3, not the least important, depression must be counteracted. The first indication is obtained by means of castor oil, or two compound rhubarb pills. Three or four three-grain powders of phenacetine are usually sufficient to relieve headache and muscular pains. Salol, two and one-half grains to each dose, may be added to the phenacetine with advantage. He deprecates antipyrine and its congeners, which serve to augment the depression, and recommends instead Hoffman's anodyne, which is diaphoretic, diuretic and stimulant. To overcome depression during and after the disease, he recommends the free use of tonics. He repeats Prof. Laffont's (of Lille) recommendation of coca preparations, those of Mariani

being given the preference. During the disease a hot grog, one-third Mariani wine of coca and two-thirds sweetened water, is administered, taken very hot, several times a day, the slight diaphoresis induced being a valuable addition to the tonic action. The editor of the *Satellite*, from which this excerpt is taken, recommends the exhibition of coca in the early stages of the disease, with a view to counteract the impending asthenia and curtail the disease.

USEFUL INFORMATION.

A SIMPLE BLUE-PRINTING FRAME.—From one of the second-story windows on the south side of the Pratt & Whitney Works, in Hartford, says *Iron Age*, is an extremely convenient arrangement for blue-printing. It consists essentially of the usual track projecting horizontally from the window sill, and upon this track runs a car formed like a turn-table, and which is prevented from running off the outer end of the track by the upturned ends of the rails. This car carries the blue-print frame, which, placed in position on the car, may be moved to the outer end of the track and then tilted at any desired angle in order to bring the blue prints under the direct rays of the sun, no matter what time of day it may be. This practically mounts the frame on a universal joint, permits utilizing the full power of the sun, and has been found to expedite the printing greatly.

THE NEW ITALIAN RIFLE.—According to an Italian military paper, the Italian Government has decided, after many trials by different infantry regiments, to adopt the 6.5 millimeter repeating rifle, similar to the Mannlicher, for use in the army. The exact particulars of the chosen weapon are as yet kept secret, but the mechanism is stated to be arranged on exactly the same system as that of the Austrian Mannlicher weapon. In well-informed circles, however, it is stated that the new rifle resembles the Mannlicher only in the magazine action. All the other parts have been invented and made in Italy, the bolt action especially being of novel construction. One of the most important recommendations in favor of this weapon is that it only weighs 7½ pounds.

FLEXIBLE METALLIC TUBING.—An English concern is now successfully making flexible metallic tubing that is perfectly tight and capable of resisting high steam or hydraulic pressure. The tubes are made from strips of metal of the required length, breadth and thickness. The strip is fed into a machine in which it is first corrugated longitudinally with a wide and a narrow corrugation, the two running side by side. The strip is carried forward, and is coiled spirally around a mandril in such a way that the smaller corrugation interlocks with the larger one, forming a piston joint. Sufficient spring is left on the tube to cause a perfectly tight joint to be formed.

A COWHIDE HORSESHOE.—In England and on the continent they have been for a long time using a horseshoe made by compressing common cowhide. It is composed of three thicknesses of cowskin pressed in a steel mold, and then subjected to a chemical preparation. It is claimed for it that it is much lighter, that it lasts longer, and that split hoofs are never known in horses using it. It is perfectly smooth at the bottom, no calks being required, the shoe adhering firmly to the most polished surface. Its elasticity prevents many sprains, the horse's steps being lighter and surer.—*Memphis Scimitar*.

STONE should never be used immediately after quarrying. It should be exposed to the weather for a month anyhow before it is used. It thus becomes seasoned and will wear much better. When left to season the under side of the rock as it lay in the quarry should be exposed to the sun. When you buy stone for paving or similar purposes insist on its being turned over, that is reversed from the way it was in the quarry before it is laid. The reason for this is that the top surface is much softer, it being of later formation, stone forming from the bottom.

RUBBER BELTS IN DAMP PLACES.—I. C. W. writes to *Fibre and Fabric* as follows: "To keep rubber belts from slipping in a dyehouse, or in a damp place, or where there is lots of steam, grease them with a composition of boiled linseed oil and ground rosin, mixed together in the boiling, and allowed to simmer to the thickness of molasses or treacle, and apply with a brush. Animal or mineral oils will not answer. Don't use cotton or woolen waste on account of fire."



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The Lordsburg Excitement.

There was little or no foundation for the Lordsburg silver excitement in Southern California, as stated in the PRESS when the announcement of the rich strikes was made. In a region where miners are few, those unfamiliar with such matters are apt to be carried away by the sight of a piece of rich ore or an assayer's certificate. Some description of the locality is given elsewhere in this number of the PRESS. The excitement was quite brief, for it did not take many days to show there was little or no basis for it. The population of Lordsburg is not likely to be augmented by a single inhabitant on account of its mines. Pyrites and mica seem abundant thereabout, but no gold and little silver. There are a good many men with little to do in the region thereabout, and it did not take much to induce them to join a mining rush. However, the boom did not last long enough to attract anybody from much of a distance, so that little harm has been done.

ARIZONA is sending out just now about as many accounts of mining strikes as Colorado is in the habit of doing. If the reporters would exercise a little better judgment in the wording, and not use such big figures, the accounts would be better credited and he of some benefit to the Territory.

A DISCOVERY of tin ore is reported in the Old Woman mountains, San Bernardino county, some 20 miles south of Danby station.

The Express Company and the Miners.

The refusal of Wells, Fargo & Co.'s Express Company to contribute anything to the furtherance of the hydraulic mining interests at this critical time has aroused much indignation among the miners. This company has for a long period of years transported all the bullion of this State, amounting to hundreds of millions of dollars, and has charged roundly for its services. The mining camps and towns have depended more on Wells, Fargo & Co. than on the postoffice for the carrying business, not only in bullion, but in packages, parcels, etc.

After the mining convention, when the California Miners' Association was organized, a committee called on prominent banks, business houses and individuals for financial aid in maintaining a committee at Washington to further the mining interests of this State. Money was also collected in the mining counties among the miners. The only refusal to contribute in this city was from Wells, Fargo & Co., the one institution which had made the most money out of the miners.

The verbal refusal, it was thought, might be reconsidered, and the Secretary of the Miners' Association addressed a letter to John J. Valentine, Vice-President and General Manager of Wells, Fargo & Co., asking for financial aid toward defraying expenses of the Miners' Committee at Washington. Mr. Valentine, in his answer, says:

I know of no reason yet for changing the view I entertained on the subject matter of your communication at the interview to which you refer and at which you were present, hence cannot respond favorably to your request. As a company, we are continually being applied to by associations of citizens having various deserving objects in view, often in the line of hethering special industries and localities, but it is no part of our business or moral obligation to help subsidize such enterprises. We claim that for all benefits we may have derived in the past from any particular industry or branch of business we have rendered a quid pro quo in the risk assumed and the service performed. You will understand, I trust, that this refusal does not carry with it any lack of respect or deference for you and others directly interested in the enterprises you wish to promote, or who differ with me in opinion, nor any unfriendliness to the enterprises themselves. I am politically a Democrat, and don't believe in the principle of subsidies in whatever form or to whatever purpose applied.

After the memorial and resolutions of the State Miners' Convention, the Miners' Association, Chamber of Commerce, State Board of Trade, San Francisco Board of Trade, Board of Supervisors, the expressions of the leading newspapers, etc., it would seem as if the manager of a great corporation like Wells, Fargo & Co. might have learned enough about the subject to have expressed himself somewhat differently. He was not asked to subsidize anything or anybody. The company was asked, as were other companies and people, to aid a popular movement which would return a hundred-fold any favors given.

The quid pro quo argument used by Mr. Valentine is refreshing, in view of the excessive charges made by his company for services rendered. The company has a complete monopoly in its line and has had it for over a quarter of a century. It is, next to that of the railroad company, the most oppressive monopoly in this State. It has made more out of the mining interests than any company here. Yet it refuses to contribute a cent toward those interests when they need aid. So large has been its bullion-carrying business that we have depended upon the company for the annual statistics of bullion production of the coast, and its tables have been looked upon as more correct than those from official sources. The aggregate bullion product of the Pacific Coast States and Territories has passed through this company's hands.

If this company had given ten times what was asked of it the amount would have been trifling compared with its profits from the hydraulic-mining industry alone. The company really refuses to assist in reviving an industry which gave it life and main-

tained it for years. And it stands alone in its refusal and its miserly position. The miners will doubtless remember this incident. It may take them some time to "get even," but such ingratitude as this refusal shows will scarcely be overlooked.

Water Frontage on the Bay.

The Risdon Iron Works announce their determination of establishing a ship-building plant in connection with their other business, and are seeking a location on the bay shore. Locations fronting deep water are scarce on the peninsula side of the bay. Potrero point and Hunter's point are already occupied—the first by the Union Iron Works, Pacific Rolling Mills, Sugar Refinery and Gas Works; the second by the dry dock. The heights of the bay between these points, and beyond Hunter's point, are shallow, wide flats extending far out from the beach. On the Marin county shore, where the water is hold, the land is steep and rough; and where the shores are level, the mud flats extend far out into the bay. Moreover, one man owns the entire strip of tide land from Point San Pedro all the way around to Sausalito, including that on Richardson's bay. The shore belongs to a number of different owners, but this one man—Wm. T. Coleman—controls the water frontage, and wharves or landings must be made on his property wherever built.

It was an outrage on the public for the Tide Land Commissioners to have deeded away to any individual the narrow strip called tide land where the deep water comes close to the rocks. In some places this strip is about six or eight feet wide only, but it serves the purpose of controlling water front privilege. Where there are wide mud flats, tide land proper, it was all right, but in other cases, all wrong. However, it is too late to mend matters. The same condition exists all around the bay wherever the tide land is worth anything.

The Risdon Iron Works prefer Oakland for a location, knowing there is no room on the San Francisco side for such a plant as they desire. They can get land bordering on the Oakland Harbor which the Government has paid for, but they cannot get from the land onto the water without paying an exorbitant price. The Oakland Water Front Co. (which is the Southern Pacific R. R. Co.) own almost the entire water frontage there, as Coleman does in Marin county. The Risdon Iron Works want to get 1700 feet of frontage, and a prohibitory price per front foot is asked for what is practically the privilege of crossing the narrow strip owned by the railroad company; and there are, in addition, all sorts of restrictions about building wharves, running ferries, etc.

If Oakland had any sort of enterprise or "go," it would raise a couple of hundred thousand dollars and offer it to the Risdon people to locate there. The works would employ from 1500 to 2000 men. The city is anxious for manufacturing establishments to come there, but does nothing to induce them. San Diego raised a large bonus for iron works, and other Southern cities have shown equal enterprise. But Oakland wants what benefits it can get without paying out any money. The Risdon people have not asked, and do not expect, any subsidy, but it would doubtless settle the question of the location of their works, should such an offer as suggested be made. The works are to be built somewhere on the bay shore, and Oakland harbor offers the best place; but the conditions of purchase, as stated, are not favorable. In fact, it would almost pay Oakland to buy back all the water front it foolishly gave away, for the sake of the manufacturing enterprises which would be established where ship and car meet under such advantageous circumstances.

OAKLAND has voted in favor of \$400,000 bonds for schoolhouses, but refused to vote for \$800,000 for a park and boulevard.

The Boss Process of Amalgamation.

(Continued from page 259.)

from the pan line of shafting through friction clutch pulleys without the use of belts. All water from the battery passes through the pans, and consequently all slimes are treated in combination with the sands. In large mills more than one circuit of pans and settlers may be employed to advantage, each circuit treating a portion of the pulp separately. The cuts (for which we are indebted to the Risdon Iron Works) show a wet silver mill and the arrangement of the continuous system of amalgamation as applied to it.

Mica.

A dispatch from Phoenix, A. T., says: Charles Hand and Ed Spencer struck a mica mine in Mohave county, north of the Colorado river. It bids fair to surpass any producer of that substance in America. The sheets vary in size from 4x10 to 6x10 inches and are remarkably smooth and free from flaws. With the exception of a very slight smoky tinge to that taken from near the surface, the sheets are clear and beautifully transparent. The owners represent that the quantity is apparently inexhaustible and easily accessible. Chicago capital will be put into the enterprise.

This sounds very well indeed, but unless the Arizona mica miners are in better luck than the California mica miners, Chicago capital will not be put into the enterprise. Nobody has made anything out of mica in this State, because there is no demand for it. North Carolina seems to have "the call" on this mineral. Some comes, also, from New Hampshire and Dakota, but the North Carolina product is most in demand. In that State, even, many mines have been closed down on account of the depression in price.

The fact is, the imported mica seems to be preferred to that of domestic production. That which comes from India is considered the best.

An important reduction in the price of mica followed the change in stove patterns by which smaller sheets of mica are used. The increased use of furnaces instead of fireplace heaters has also lessened the use of mica. But a large demand for mica for use in dynamos has sprung up. Strips, usually one inch wide and eight inches long, are made part of the insulating material in building up the armatures. But this new use has had little effect on the domestic mica mines. It is entirely a feature of the import trade, as the manufacturers prefer the foreign material on account of its superior cleavage. There is no doubt that mica which will split into thin and exactly even pieces can be found in the United States, but there is also no doubt that some imported mica has proved more suitable than the usual grade of the domestic material. The consumption of ground mica waste, as an addition to lubricants, keeps our mines running, as about 90 per cent of the domestic is used in this way. The size of the sheets obtainable is, for this purpose, of no moment.

TAILINGS MILL STOP.—The Douglass mill (formerly the Birdall) at Dayton, Nev. has closed down, and it is announced that the mill will not start up again unless the silver hill passes. For several years past it has been running on slimes and tailings deposited at the mouth of the six-mile canyon in the early days of the Comstock. The deposit is sufficient to keep the mill running for 20 years to come, if the price of silver was close to the dollar mark. Fifty men are thrown out of employment. It is reported also that the Ophir mill, which has run on tailings for 12 years, will shut down.

THE Peabody mine, at Grass Valley, is turning out more very rich specimens.

Loading Ore and Coal on Cars.

At the iron breaker at Drifton, Pa., there are two types of loading lips—one for lump and steamboat coal and the other for the sized or prepared coal. The lump and steamboat lips (Fig. 2), of which there are two in each chute, consist essentially of a gate (8 and 11), below which there is a set of bars (7) and below these a sheet iron trough (9), a portion of which (10) is movable and can be slid into the car. When cars are to be loaded, the gate is raised; the coal is allowed to slide slowly over the bars (7), which take out the small coal that has been formed in the chute, and the coal that is cleaned slides through the chutes into the cars. Of course, it is necessary to draw the lump chute into the loading chute gradually, so as to avoid corners, edges and other hindrances, which occasion breakage in the coal.

The loading lips for prepared coal are of two types—one for loading the ordinary open-top cars and the other for loading either the open-top cars or box cars. The two types are shown in Fig. 1—the one on the left hand being for open-top cars and the other for box cars. The coal which falls out above (8) through the opening in the bottom, at the extreme end, passes down over (8) a perforated plate, the form of which is shown to the left of the lower part of the box car. Through these perforations the fine dirt falls out and is carried away by the drag flights (32), the coal sliding through the chute (6) into the car. The only difference on the other side is that the chute (10) slides back on the rollers (11) so as to allow the car to pass. The gates serve to check and regulate the flow of coal. This chute can also be used to load ordinary open-top cars.

The numbered parts of Fig. 1, showing details, are as follows: 2, post of breaker; 3, I-beam supporting plates forming floor of

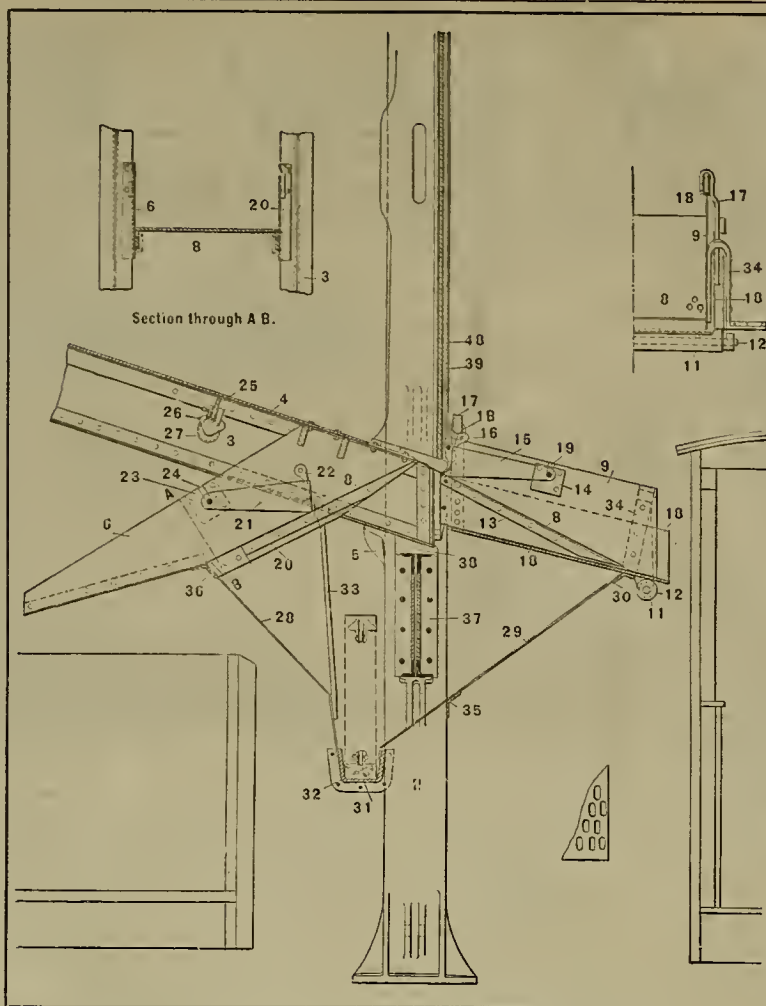


FIG. 1.—POCKET LOADING LIP FOR PREPARED COAL.

pockets; 4, floor of pockets; 5, bracket on post to support I-beam; 6, side sheets on inside spout; 8, screen jacket forming bottom of lip; 9, side sheet of stationary part of spout on outside lip; 10, side sheet of adjustable spout on outside lip; 11, long roller under adjustable lip; 12, axle for long roller (11); 13, angle-iron support for screen jacket for outside lip; 14, fulcrum bracket for gate; 15, gate for outside lip; 16, bracket for attaching rope; 17, frame for friction rollers, rolling on (9); 18, friction rollers, running on (9); 19, slot to admit gate fulcrum; 20, angle-iron support for screen jacket on inside lip; 21, gate for inside lip; 22, bracket for attaching rope; 23, fulcrum bracket for gate; 24, slot to admit gate fulcrum; 25, rib on floor of pocket to attach rope pulley; 26, pedestal for rope pulley; 27, rope pulley; 28, sheet iron forming inside of drag hopper; 29, sheet iron forming outside of drag hopper; 30, angle connection between drag-hopper side and outside spout; 31, cast drag trough; 32, drag flights; 33, brace to support inside of drag hopper; 34, hanger for long friction roller; 35, angle connection between post and outside sheet of drag hopper; 36, angle connection between inside sheet of drag hopper and spout; 37, built up 24-inch I-beam; 38, cast-iron chair supporting I-beam (3); 39, rabbet strip cast on side of post; 40, cast plates in end of pockets fitting in rabbet strips (39).

The details of Fig. 2 are explained by reference to the following numbered parts: 2, flaring sides of lip above bars; 3, flaring sides of lip on either side of bars (7); 4, bumper; 5, cast iron plates on mouth of lip; 6, bar bearer; 7, finger bars; 8, diamond-pointed gate bars; 9, stationary part of spout; 10, sliding part of spout; 11, planking forming breast of gate; 12, flanges on end of bar bearer (6); 13, finger-bar bolts; 14, stiffeners on end of sheets (3); 15, screenings hopper under bars; 16, inclined trough leading to screenings drag; 17, bracket for carrying friction pulley (18) running on (9); 18, friction rollers running on (9); 19, gate arms; 20, gate fulcrum; 21, hanger for long friction roller under movable spout; 22, long friction roller under sliding spout; 23, shaft for long friction roller; 24, bottom flange on side sheet (2); 25, point of partition wedge.

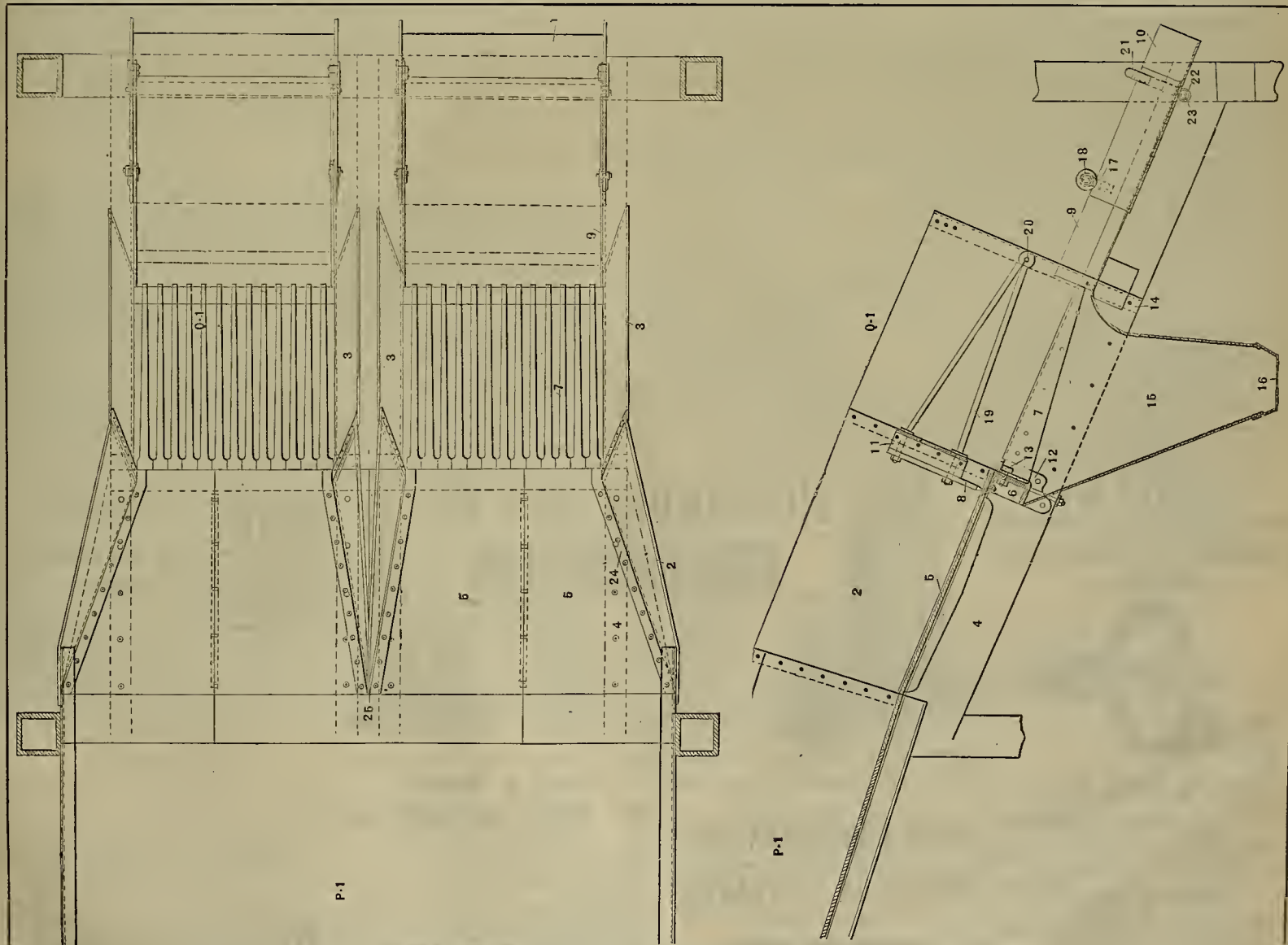


FIG. 2.—STEAMBOAT LOADING LIP FOR HANDLING COAL OR ORE IN QUANTITIES.

The Cienegas of Southern California.

[A paper read at the last meeting of the American Geological Society by PROF. E. W. HILGARD of the University of California.]

A *cienega*, in the parlance of the native Californian, is a limited area showing a growth of water-loving plants, appearing sporadically in otherwise arid surroundings—usually hillsides or valley margins—and occasionally giving rise to flowing springs. The economic importance lately attained by these *cienegas* as sources of irrigation water by the aid of artesian borings, and some peculiarities of structure upon which their occurrence in that particular region seems to depend, justify at least a brief presentation of the facts to this body.

A simple and typical case in point is presented, for instance, by San Antonio creek, a stream issuing from a canyon in the Sierra Madre near the town of Pomona, in the San Bernardino valley, Los Angeles county. It is near the present divide between the adjacent drainage basins of the San Gabriel river on the west and the Santa Ana river on the east. Though a small stream, carrying only from 700 to 800 miner's inches of water in summer time, it has formed in front of its exit from the canyon a debris cone or "fan" having a radius of seven or eight miles, of which the apex, near the canyon mouth, is between 400 and 500 feet above its base. On the slopes of this fan, as well as near its base, there appear numerous *cienegas*, some less than an acre in area, while others range up to 20 acres and over. In some of these, large sycamore trees are the only unusual indication amid the "bee-pastures" of white sage, cactus and other plants characteristic of the dry mesas of the South. In others there is added the willow and clumps of "tule" (cat-tail) and other swamp plants. From some, springs issue naturally; in all, shallow dug wells find water; in many of them, artesian bores have been made with good success. The deposits penetrated in these bores are, of course, such as may be expected in a debris-fan; but they vary so quickly and completely in wells only a short distance apart as to show that the ancient portions of the fan have been formed under a regime exactly like the present—namely, an alternation of very coarse deposits of gravel and large cobbles, such as are now carried by the stream during the torrential floods to which the high ranges are subject, with fine silt and even clay, which are practically impervious to water. The abrupt diminution of velocity on emergence from the canyon results in the quick accumulation of cobble ridges or "kames," which sometimes change the main channel, within a few hours, to a totally different direction. It is obvious that in past times such changes of channel have thrown the water of the creek from one drainage basin to the other; at present it discharges toward the Santa Ana basin, but unless artificially prevented, there is no reason why it may not some time revert to the San Gabriel watershed.

If we imagine the structure that must result from such a mode of accumulation of a debris-fan, the sporadic appearance and peculiar localization of the *cienegas* (being the point at which the water fed into the cone at the mouth of the canyon is forced near to the surface, either by a cross ridge or by the termination of a water-bearing cobble bed underlain by an impervious layer) is easy to understand. But it is also obvious that the continued supply of water from the stream into the various old channels of the debris cone must depend upon the maintenance of the open gravel surface at the apex of the cone. When this is wholly or partially closed, whether by natural or artificial processes, then, the source of supply being stopped, the springs or artesian wells dependent upon it must diminish or cease to flow. Such variations and stoppages have already been experienced at several points, and as they may prove very costly, if not disastrous, to heavy investments already made, it is quite important that the need of keeping the area of infiltration open for the winter floods should be fully understood by the populations concerned. When this is attended to, it is obvious that we have here natural storage reservoirs for flood waters, annually replenished and likely to be fully refilled each season, no matter how heavy may have been the drafts made upon them during the preceding irrigation season.

The most extensive example of debris-fan storage of flood waters thus far known to me occurs in the upper San Bernardino valley, at the head of which two large streams,

the Santa Ana river and Mill creek, emerge from narrow canyons, at whose outlets there are truly phenomenal accumulations of huge boulders, which in time of flood are tossed about by the torrents with a thundering noise sometimes audible miles away. Here are many square miles of open cobble surface, into which flood waters can be and are absorbed with the greatest ease, although in the usual channels of the summer flow the bottom is made sensibly waterproof by finer sediments. Costly tunnels have been driven through these cobble beds under the impression that large amounts of water could be thus collected; but while the constant drip proves the perviousness and absorbent nature of the deposit, that very circumstance prevents the gathering together of any very large supply of water in the relatively insignificant areas of the artificial drifts.

From the head of the debris-fan of Mill creek to its base, near the town of San Bernardino, the distance is between 12 and 14 miles, according to the initial point chosen; the fall of the surface within the same distance is between 600 and 700 feet. The average width of the valley is about 10 miles, and artesian borings have shown the gravels and cobbles to be nearly a thousand feet in thickness within a mile of the southeastern edge. This enormous gravel mass, filled with water from the floods of the two streams, forms a natural reservoir of such magnitude that the drafts thus far made upon it by the numerous boreholes sunk in the lower valley have failed to show any such degree of mutual interdependence as is usually observed in wells situated short distances apart—a fact which I have ascertained by experimental measurements made under proper conditions. This relative independence of the flow of contiguous wells also indicates that the water-bearing stratum consists of gravel so large and so open that the water mass may be considered as exerting its pressure rather freely in all directions; yet on reopening a closed well there always exists a material accumulation of pressure, which takes several hours to recede to its normal amount.

Besides the artificial outlets mentioned, however, there is a number of natural outlets on the slope of this great gravel reservoir. The most conspicuous is the source of Warm creek, the stream which has been appropriated for the purpose of irrigating the well-known colony of Riverside. Warm creek has no visible connection with any of the streams that descend from the Sierra Madre; it rises in the valley itself, fully three miles away from the foot of the range. There is no obvious reason for its being there, but the water gathers from little rills and ditches within a space of about a quarter of a mile, acquiring within that distance nearly its full volume of from 2000 to 2500 inches during the dry season. At other points, also, "artesian" springs rise with considerable force and volume, and in the immediate floodplain of the Santa Ana river, rivulets gather at many points on the margins, at the foot of the bluff, some 7 or 8 feet above the river channel, and flow toward the latter to increase the volume of the stream. It thus happens that "the entire flow of the Santa Ana river" has been appropriated at least three different points, each appropriator receiving a good flow, and that in the absence of any obvious important additions from incoming streams. As may be supposed, boreholes sunk in this region of spontaneous flows encounter at very small depths (from 120 to 150 feet) very copious flows of artesian water, in cobble-beds; while near the border of the valley not only is a greater depth required and the outflow less, but the materials penetrated are much finer.

Since the terraces of reddish loam that border the foot of the Sierra Madre from the head of the valley to the San Gabriel river indicate plainly that the subdivision of the valley into two drainage basins is a comparatively recent event, it does not seem improbable that the artesian reserve referred to might be tapped by deep borings much farther westward than has heretofore been attempted; perhaps within easy reach of the city of Los Angeles.

A very striking exemplification of the origin of *cienegas* exists in the valley of Temescal Creek, one of the southern affluents of the Santa Ana river, in San Bernardino county. This creek is really the natural continuation of the San Jacinto river of San Diego county, but an intervening lake basin (Lake Elsinore) prevents actual flow from the latter stream to the Temescal valley, save in seasons of extraordinary rainfall. Its water is supplied almost entirely from the canyons of the Santa Ana mountains, which

have a rather copious rainfall in their higher portions. At the head of the valley there is a small lake (Lee Lake), which, with no visible inflow, nevertheless has at its lower end a steady outflow of about 400 miner's inches of water during the dry season, thus forming part of the water supply of the "South Riverside" Colony. Examination shows that the lake is fed entirely by a series of springs, or rather an almost continuous ooze, from the enormous masses of granitic and other debris that have accumulated in front of the two uppermost canyons of the Temescal valley, and which reach entirely across the valley to the foot of the (Temescal) range opposite. These debris masses are so porous that actual surface flow very rarely occurs, and no well-defined bed for a stream exists save where, close to the lake basin, the materials are relatively fine. Evidently the main body of the rainfall gathered into these canyons is stored in the coarser portions of the debris-fans above.

Below this lake basin the Temescal valley is divided lengthwise by a series of low ridges formed of materials mostly impervious to water, of Tertiary age. In front of the canyons of this lower portion of the valley similar great debris masses have accumulated also; but since the impervious ridges mentioned prevent the outflow of water save during actual freshets (when small streams pass through the gaps in the ridges), extensive *cienegas* have been formed between the valley ridges and the foot of the Santa Ana range. In these, as in the upper San Bernardino valley, "artesian" springs rise at many points, and vegetation remains bright green all summer. Borings thus far made have developed a very copious artesian flow, and a tunnel driven through one of the clay ridges toward the *cienega* was suddenly inundated when its face reached the gravel of the debris mass, about 40 feet below the surface. The artesian wells and natural surface flow from these *cienegas*, so far as developed, yield an aggregate flow of nearly 600 miner's inches, which can doubtless be materially increased; and this, with the flow from the lake above, constitutes the water supply for the colonies below.

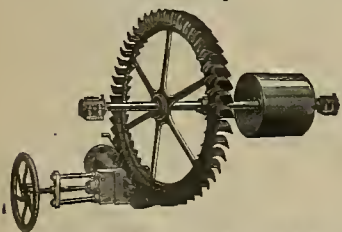
These examples, which could be greatly multiplied, show sufficiently both the nature and origin of the *cienegas*, and also their practical importance as sources of water supply, which calls for a more careful survey of their extent of occurrence than has heretofore been made. While they do not render the establishment of artificial storage reservoirs superfluous, they do supplement them locally to a very material extent, rendering it possible to occupy for agriculture large areas that otherwise would have remained arid for many years to come. But there arises the question as to the geographic limits within which these natural storage reservoirs may reasonably be sought, for it is notorious that they are not usually found, and the name and idea of the *cienega* is not generally known in the northern portions of California.

The essential condition of *cienega* formation is manifestly the opportunity for the abundant formation of deposits of exceptionally coarse and pervious gravel and cobbles near the points where the canyons emerge from the mountains. This, again, is necessarily conditioned upon the occasional occurrence of violent, torrential rainfall in the mountains, alternating with periods when quiet deposition allows of the formation of water-shedding layers. Another condition appears to be the ready weathering of the parent rocks into rounded forms, by which close packing is prevented, so that abundant interspaces are permanently maintained.

Both conditions are fulfilled to an unusual extent in the granitic ranges of Southern California. The rock is rather easily disintegrated, first into larger and then into smaller rounded masses, from which large quantities of very coarse angular sand have been detached, and which continue to disintegrate rapidly when exposed to the air, but are relatively stable when submerged in the debris mass, and so maintain porosity. Such granitic or granitoid material forms the main body of all the larger *cienegas* I have examined in Southern California, and the remarkably large proportion of potash contained in their waters in consequence is of no small economic importance.

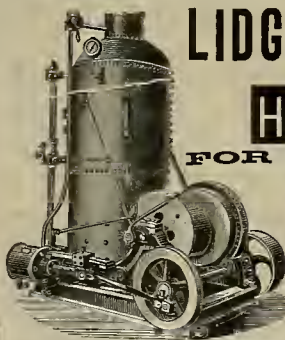
It is therefore reasonable to presume, and it seems *a priori* probable, that a concurrence of the two conditions, climatic and petrographic, is requisite for the formation of *cienegas* upon a practically useful scale, and the extent to which this concurrence actually exists, geographically, is a question of no little practical interest.

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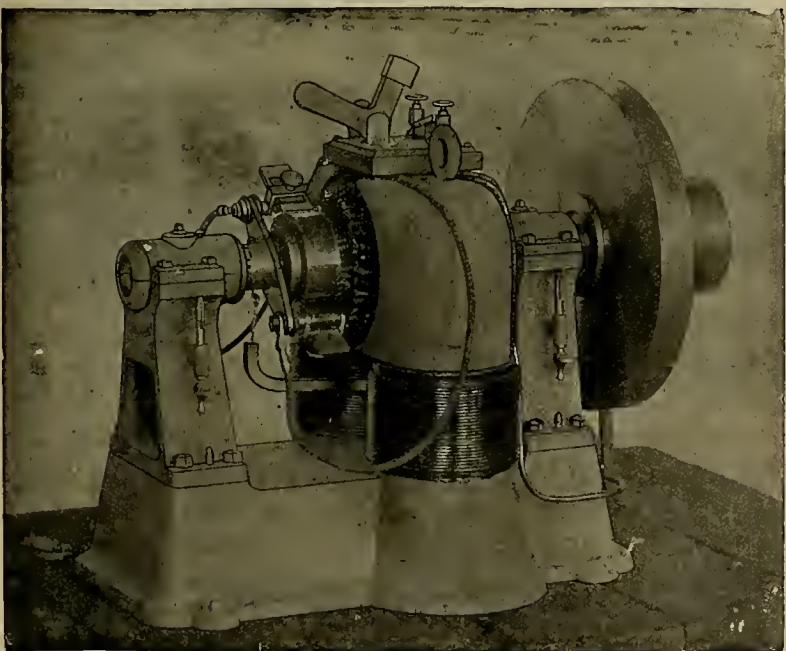
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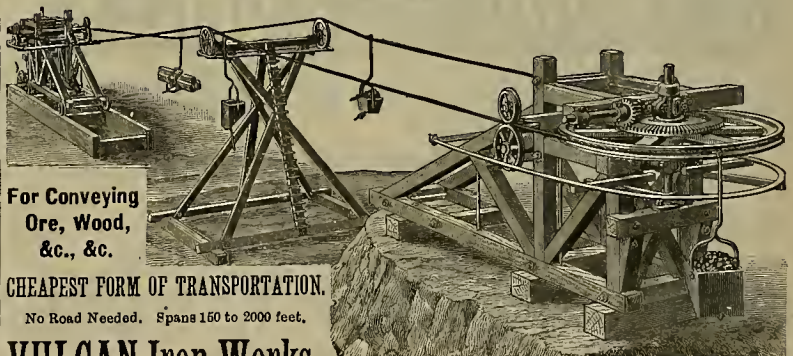


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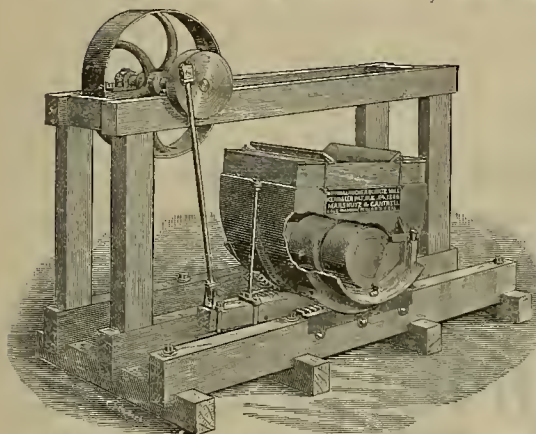
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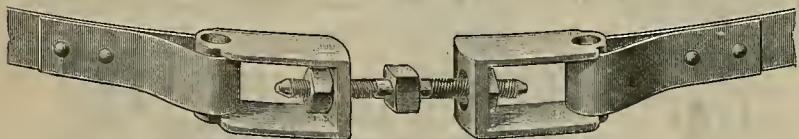
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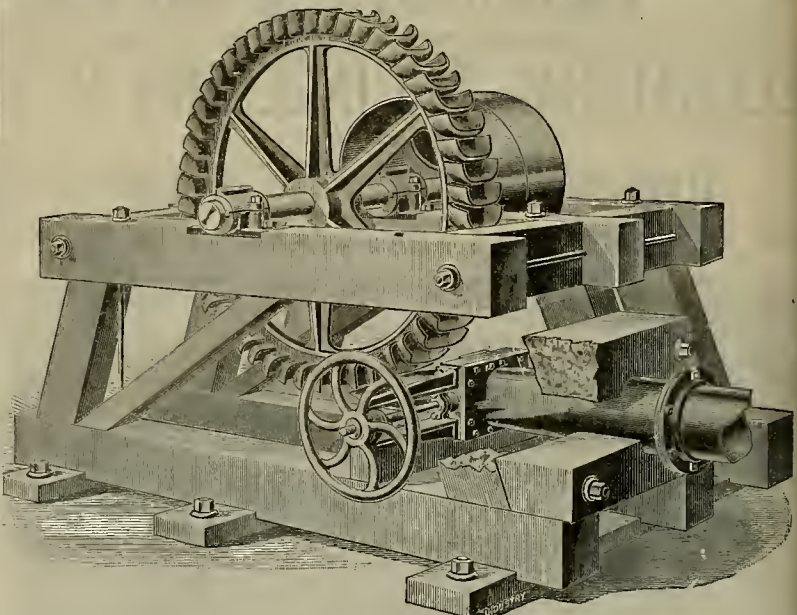
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Nevada County Mines.

NEVADA CITY, Cal., April 1, 1892.

TO THE EDITOR: Your correspondent, after spending several days in this really attractive and substantial town, has come to the conclusion that Nevada City is destined to see a better day. Just at present business is rather dull. There are several quartz mines in the district operating, and two or three gravel mines are being worked in a comparatively small way. The great Manzanita hydraulic mine is the principal source of activity. A substantial hoist was erected in the great pit made several years ago by the irresistible streams from the monitors. At this point an incline has been run something like 500 feet toward the channel, and at the time of my visit mining operations had been suspended and the entire force of men was at work moving the old pipe line, it being the intention to carry the water directly to the hoist, where Pelton water-wheels will be used to hoist and pump. Drifting in the rich channel will soon begin and the results are looked forward to with much hope by the men, as most of them are taking stock as part payment for their work.

A few hundred yards distant on the hill back of the Manzanita mine miners are sinking in the gravel deposit of the Odin mine, and others, I was told, were working on the West Harmony. Everybody in this section is looking forward to the resumption of hydraulic mining and a return of the "good old days." One enthusiastic gentleman, a superintendent of one of the most valuable hydraulic mines in all California, said to me: "If we ever do turn the giants loose again no power on earth, or below it, will be able to stop us. Those who have antagonized us heretofore now see their mistake and are as anxious as anyone to see us resume." This seems to be the general feeling throughout the placer mining districts. There are a few who shake their heads dubiously and solemnly prophesy that "it will never be," "too good to be true," etc., but I am confident that the efforts of the Miners' Association have not been in vain, and that two years from now will see a constant stream of golden wealth pouring from these golden hills.

THE QUARTZ MINING INDUSTRY.

At Nevada, quartz mining, while now the chief industry, will quickly fall in the rear when hydraulic mining is resumed. There are, however, at present a number of mines operating here. Among them the Champion, Pittsburg, Gold Flat, Banner, Federal Loan, etc. The Champion is a thoroughly equipped property, located about a mile down the creek from town. It is under the superintendency of L. P. Goldstone, and is doing well at present, I am told.

Captain White is in charge of the Pittsburg, near the city. He is working twenty men. This mine has a good, substantial hoist and a model 10-stamp mill, which is run by Pelton wheels, of which there are two, one for the rock breaker and a larger one for running the batteries and vanners. At present the mill is running on old stull dirt and screenings from the dumps, which Captain White assured me paid handsomely. Meantime, prospecting is being carried on, but with what results I could not learn. The mine has been operated more or less for 40 years past and has made a good record.

The Federal Loan is one of the most promising properties hereabout. It is located in Willow valley district, a few miles from Nevada City. The main shaft is down 400 feet and a vein of blue ribbon quartz from two to five feet in width has been developed. It is quite heavily mineralized, carrying marcasite, pyrite, blende and a little galena. These sulphides, I am told, assay from \$250 to \$500 a ton and are sold readily in the market to the highest bidder. The Federal Loan is a branching vein, as for instance, on the 400-foot level there are three separate drifts, following different spurs of the vein, all of good size and of approximately equal value.

The machinery on this property consists of a hoist and pumps, which have now become inadequate, but contracts are out for new hoisting and pumping machinery which will carry the work down at least 2000 feet. A very convenient mill of five stamps, but arranged with power and other equipments for ten, is at present crushing the ore. Two vanning machines are in use and give perfect satisfaction.

At the Gold Flat, Thomas Wosley, superintendent, sinking is in progress, and some very good-looking ore was being raised at the time of my visit, some of the quartz showing free gold. This property has no mill at present, the owners preferring to first develop a mine. A large and constantly in-

creasing volume of water has to be contended with, though this may not become much greater when farther depth is attained. The mine is located in a flat, basin-like depression and catches a large amount of surface water, besides naturally draining some old workings near at hand. One custom mill is crushing rock in Nevada City, and this appears to do well.

The chlorination works on the edge of town were working two furnaces while I was there. Few facts were obtainable concerning this institution, but from all that could be learned, Mr. Vost is satisfied with his venture.

I am confident that both Nevada City and Grass Valley are on the verge of a new era of prosperity, and it will probably not be long in reaching. Men of little means are out prospecting and new work is being inaugurated in many places, but these men need the aid of the men of means; without this combination, progress is always slow.

W. H. STORMS.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 29, 1892.

- 471,943.—INDICATOR—I. Burlingame, Fremont, Wash.
471,944.—REFRIGERATOR—Burnham & Meyers, S. F.
471,935.—TELEPHONE RECEIVER—Christy & Baldwin, S. F.
471,953.—CONNECTING ROD JOINT, ETC.—W. A. Glendham, S. F.
471,635.—CAR BRAKE—W. B. Flinn, S. F.
471,751.—GOLD SEPARATOR—J. B. Freeman, Los Angeles, Cal.
471,968.—ELECTRIC LIGHT CRANE—Jas. Gallagher, Oakland, Cal.
471,856.—PRESCRIPTION FILE—G. L. Goodman, S. F.
471,770.—TRICYCLE—A. E. Miller, Sprague, Wash.
471,878.—STUMP PULLER—W. B. Morris, Seattle, Wash.
471,887.—DENTAL DISK HOLDER—E. E. Park, S. F.
471,91.—BRAKE SHOE—M. A. Penney, Paris, Cal.
471,897.—BEVEL SQUARE—G. R. Richardson, Lathrop, Cal.
471,764.—ADJUSTABLE HEAD SECTION FOR BARS—L. H. Steffy, San Diego, Cal.
471,914.—SAFETY GAS BURNER—G. L. Thuen, Oroville, Cal.
471,915.—PLOW—D. C. Turner, Roseburg, Or.
471,755.—SNATCH BLOCK—A. Uren, Seattle, Wash.
471,918.—HOUSE DOOR LETTER BOX—Ada H. Van Pelt, Oakland, Cal.
471,920.—EXCAVATOR—C. A. Warren, S. F.
471,587.—INSULATING ELECTRIC CONDUCTOR—J. B. Williams, Oakland, Cal.
471,588.—INSULATING ELECTRIC CONDUCTOR—J. B. Williams, Oakland, Cal.

The following brief list by telegraph, for April 5 will appear more complete on receipt of mail advices:

California—Henry Bohls, San Francisco, cigarette machine; Henry P. Christie, San Francisco, friction coupling; David B. Engle, Guerneville, hillside plow; Edwin G. Gillespie, Artesia, music-leaf turner; John Higham, Oakland, baby jumper; Jessie J. Mattie and T. H. Rhodes, Los Angeles, toll-collecting apparatus for telephone; Mondula Leak, San Francisco, exhibition car; Charles L. Mann, Colma, pruning implement; Henry J. Small, Sacramento, label holder; Wm. P. Sweetland, San Francisco, nut lock.

Oregon—Emil Christiansen, Portland, saw filing and setting machine; Andrew T. Lewis, E. Portland, and F. V. Downing, Portland, magazine tack hammer.

Washington—Alexander Begg, Seattle, automatic apparatus for the sale of newspapers; Wm. Grath, Seattle, post-marking and stamp canceling machine; Robert Moran, Seattle, coin-actuated vending machine; Herman A. Todd and A. H. Anderson, Shelton, journal-bearing plate for logging cars and chuck block for logging cars, three designs.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest possible time by mail for telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

HOUSE-DOOR LETTER BOX.—Ada H. Van Pelt, Oakland, assignor of one-half to C. L. Maxwell. No. 471,918. Dated March 29, 1892. In the construction of letter boxes for the reception of mail matter, it is desirable to provide a box which can be easily attached to the door or other point without unduly marring the wood-work or place to which it is attached; to make the box water and dust proof, and at the same time leave its contents discernible from the outside; to make the operative parts so nearly automatic that but little difficulty will be experienced in operating them, and at the same time make the box of as small bulk as possible. These points appear to have been covered by this invention, and the letter box constructed on this design occupies the least possible depth from the face of the door outwardly, and provides a very safe and tight receptacle for letters and papers.

SAFETY ATTACHMENT FOR GAS BURNERS.—Gerhard L. Thnen, Oroville. No. 471,914. Dated March 29, 1892. This is an attachment for gas

burners, whereby the supply cock or valve is automatically closed whenever the gas is extinguished accidentally or otherwise. It consists of a segment or quadrant loosely fixed to the upper end of the cock, so as to be turned with it or independently of it; a latch by which it is held when the cock is open; a disengaging device actuated by the cooling and contraction of certain parts whenever the gas is extinguished, and a spring acting upon the segment, so that when the latter is released from its holding device, the spring will turn it and cause it to close the cock and cut off the supply of gas. The device is quite an ingenious one, and will be especially useful in hotels, etc., where there is liability of the gas being blown out or turned off and on again by ignorant or careless persons.

DENTAL DISK HOLDER.—Edward E. Park, S. F. No. 471,887. Dated March 29, 1892. This is a mandrel which is especially applicable upon dental engines and lathes. It consists of a sleeve having an enlarged, roughened head or flange, a stem adapted to pass through said sleeve, said stem having a head upon it with its inner face correspondingly roughened, so that polishing or grinding disks may be held between the two roughened faces, and in connection with these of a mandrel adapted to pass through the hand-piece of the dental instrument and having a screw-threaded hole in the end, into which the inner end of the pin is screwed, so as to compress and bind the polishing plate between the head of the sleeve and that of the pin. By this construction a single mandrel may be employed for a great variety and number of different disks, and the expense is greatly lessened, as the mandrel does not have to be sacrificed when the disk is worn out or useless.

ELECTRIC LIGHT CRANE.—James Gallagher, Oakland, assignor of one-half to John A. Britton. No. 471,968. Dated March 29, 1892. This is an improvement in devices for suspending electric lights at street corners and other points. A short distance below the cross arm at the top of the mast or pole is another cross arm or bracket from which rods project, supporting and forming part of the crane proper. By suspending the arm of the crane from the end of the bracket, which projects to one side of the pole, the inventor dispenses with the heavy counterweight which would be necessary upon the opposite side if the arm were journaled upon the top of the pole and the weight of all the parts is reduced. The device is easily operated, so that the lamp-carrying arm can be swung to bring the lamp within reach of the operator on the platform below and can then be raised to the proper position again. The crane is made of gas pipe and is light and ornamental.

Large Power from a Small Amount of Water.

The Pelton Water Wheel Co. have recently furnished the Commercial Mining Co. of Arizona a power plant, which affords a good illustration of the extraordinary results that can be obtained from a small quantity of water under a high head, as also the estimate of value placed upon water power where so large an outlay is made for a comparatively small amount of power. This plant consists of a four-foot Pelton wheel, which runs under a 1200-foot head at 699 revs. per min., developing 45 h. p., using a nozzle tip 53 100 of an inch in diameter. Also a 24 inch Pelton wheel running under the same head at 1380 revs., developing 20 h. p. with a nozzle tip 35-100 of an inch in diameter.

These wheels run a concentrating and smelting plant, including rock-breaker, blowers, pump, etc. The pipe line is 20,000 feet in length, the upper end being 6 and 5-inch casing and the lower end 5-inch lapweld pipe.

All the water supply that can be counted on during the dry season is a flow of about 30 cubic ft. per min. The large expenditure here made in pipe line for results obtained will indicate the advantage that water power has over steam under much more unfavorable conditions than generally exist.

GEARY'S Chinese exclusion bill has passed the House. The bill absolutely prohibits any Chinese, whether or not a subject of China (excepting diplomatic and consular officers and servants) from entering the United States; and Chinese who may hereafter leave the United States are prohibited from returning to this country. It makes liable to arrest Chinese or persons of Chinese descent entering the United States or found unlawfully therein, and provides for their punishment by imprisonment, not exceeding five years, and subsequent removal to the country whence they came, provided when they come by way of contiguous foreign territory they shall be returned to China.

MESSRS. ROBERT McMURRAY and Frank McLaughlin, who have been assisting the Miners' cause in Washington, will return next Monday in company with Hon. Joseph McKenna.

BOOKS OF THE MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.

GLASS IN BUILDINGS.—For some time past transparent glass bricks have been let into the walls to afford light at places where a window would interfere with the architectural plan; but now it is proposed to cast glass, not necessarily transparent, into large blocks of buildings. This material is practically indestructible, perfectly non-absorbent, and, therefore, damp-proof in a manner which few bricks are, and in this way coarse glass of this kind could be made nearly as cheap as concrete, stone or baked clay.

Complimentary Samples.

Persons receiving this paper marked, are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

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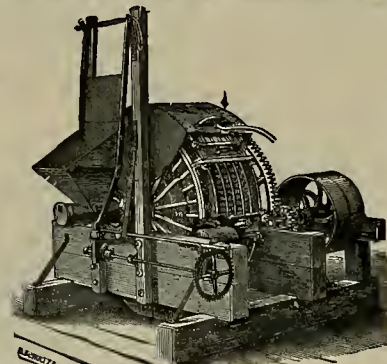
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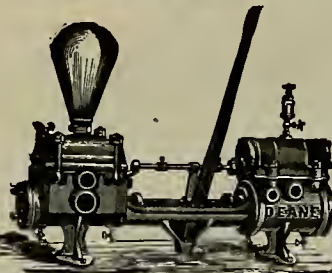
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, April 7, 1892

Business continues disappointingly dull, puzzling the oldest merchant in trade as to the cause or causes. The consensus of opinion among the majority is that to the Railroad Company's high freight charges on goods shipped from this city to local points, can be laid the onus of the present situation, and until they are reduced San Francisco will not gain trans. Up north, the overland railroads are doing all in their power to build up terminal points, whereas, in this State it looks as if the railroad which controls the traffic of this city is doing all in its power to tear down and not build up. To show the extent of railroad construction up north, calculated to develop Oregon and Washington, we give the following from the New York *World and Exporter*. It is expected that the Great Northern will get through the Spokane this summer. Work upon the gap between Puget Sound and the end of its track in Northern Idaho is being pushed rapidly, and through trains are expected to be run from St. Paul to Puget Sound by May, 1893. The Northern Pacific spent \$3,232,800 last year in improvements and extensions in Oregon, Idaho, Oregon and Idaho. Both this company and the Great Northern are contemplating competitive building from Spokane to Ellensburg. The Burlington and Quincy is extending its Chicago, Burlington and Missouri branch northward to Helena, where connection for Puget Sound could be made with the Great Northern, Northern Pacific, or by a line of its own. The Canadian Pacific proper to build through the Rockies a new line which will bring Montreal a day nearer the Pacific. The distance between that city and Vancouver will, it is estimated, be covered in 72 hours. The Canadian Pacific is also understood to be surveying for a number of branches to develop the interior of British Columbia.

The local money market is easy, with the available surplus in the city steadily increasing. There is very little call for funds. This is well illustrated by a decrease of over \$3,000,000 in the bank clearance balances for the last week, compared with the clearances for the like week in 1891. Eastern mail advices report money easy in New York and dull in Boston, with funds at the Clearing House in excess of the demand. The market at Chicago is very easy, the banks having a large surplus which they are doing to in employing. The demand at Kansas City is not sufficient to keep down deposits. There is a large supply of money at St. Paul, with light demand. Money is in light demand and increased supply at New Orleans.

The exports of silver from the port of New York from January 1, 1892, to March 26 have been \$5,601,458 and the imports \$3,339,633. The exports of gold from January 1 to March 26 have been \$5,853,999, and the exports \$12,191,605.

QUICKSILVER—Receipts the past week aggregate 298 flasks, and the exports by sea 197 flasks to Mexico. The market is steady at quotations. The exports from this port during the first three months of the year aggregate 3376 flasks, of which 2100 went to New York, 657 to Mexico, 837 to Australia, 200 to British Columbia, and 82 to Central America.

MEXICAN DOLLARS—Exports by sea the past week aggregate 41,863 to China. The market is dull and heavy at around 69 to 69½ cts. Many dealers are afraid of the market, and only buy to meet current wants.

SILVER—The market at the East and also abroad advanced slightly up to Monday, when a weaker tone set in which was followed by lower quotations. The market moved up and then down, in sympathy with the Eastern market. To-day, private advices report a stronger tone in New York, with certificates slightly higher; but public telegrams report bullion one-fourth of a cent lower. Mint purchases so far in this month aggregate over \$1,000,000, which indicate that the monthly requirement will be secured at an earlier date than last month. The market is very feverish and unhealthy as if manipulators were trying to get quotations down to lower prices; but why, it is difficult to conjecture unless they are buying up securities whose market values hinge on that of silver. It is an open secret that Comstock mine managers prefer silver as a commodity, although they talk free coinage. Our exchanges continue to report silver mines closing at shut. The price of silver is being the only one that Senator Morgan has introduced in the U. S. Senate a bill providing for the free coinage of silver, but confining it to the product of the mines in this country. If it becomes a law, the depositor of bullion, either gold or silver, has the option to take coin or coin certificate. This bill meets a serious objection, raised by many against free coinage without restriction. The principal is in making the one product of the mine the only one that Congress will not act on a free coinage bill at this session, but sometimes legislative bodies surprise all by doing the unexpected.

LIME—Receipts the past week aggregate 1934 bbls. Cutting in prices is reported.

ANTIMONY—The market is easy. New York advices report a weak tone, with quotations the same as reported last week.

LEAD—Pig is firm, with shot higher. Eastern advices report holders firm in their views and rather reserved in their offerings. Consumers and buyers are indifferent operators.

COPPER—The market begins to show more strength, which gives color to the report that a combine is being formed. The consumption of copper in America and Europe shows a steady increase. New York *Iron Age*, March 31, reports that the combine was not an assured success, outside holders and some of the smaller producers manifested uneasiness, while consumers retired, abiding developments, leaving matters somewhat chaotic. The outcome was free offering at reduced prices and a contracted outlet, with Lake Superior iron openly on sale at 12½, and in remote instances, at about 1½ cts less. The best brands followed in the wake and were exceedingly difficult to sell at 1½ cts in other than very moderate quantities.

PIG IRON—The market is reported essentially unchanged. The consumption is free, while the supply is large. Eastern mail advices continue to note unsettled markets, due to a cutting in prices between Northern and Southern furnaces; so far the latter appear to have the advantage.

IRON—The market is strong at full figures. Plate is going into consumption more freely, but as canners and other consumers were supplied ahead, they will not be in the market for a short time. European advices report pig unfavorably affected by the price of silver.

COAL—Imports the past week aggregate as follows: Sydney 3246 tons, Newcastle, N. S. W., 3539, Departure Bay 1232, Nanaimo 2450, Comox 4300, Total 18,732 tons. The market for spot, to arrive and for shipment is still in favor of buyers. The consumptive demand is slow. The tonnage on berth at Australian ports for this city is steadily increasing. As our wheat crop prospects are of the best, it looks as if we will have very low prices for coal for the next 12 months to come.

Mining Share Market.

SAN FRANCISCO, April 7, 1892.

Mining shares the past week hung around blackboard quotations up to Tuesday, when "the short interest" reported by an afternoon paper began to fill, but it was at declining prices which was a decided boomerang to the few bulls on the outside who had been made to believe that much better prices would follow before lower figures obtained. The stock was taken up by the Press of last week, and now that it has come, the writer thinks a sharp upmove is near at hand, when the long who gets out at the advance will have no cause for regret. What the upmove will be made on it is hard to say but it looks very much as if it will be on ore strike in Oregon, Virginia, yet it may possibly be based on having the superintendent of the above mentioned and also the superintendent of Hale & Norcross in filing their reports, conform to the law requiring car sample assays of all ore found. If these assays are given, it will be a long stride in the path of reform and which will do no little in removing the great stumbling block to outside moneyed men operating on the market. Overman has for several months given both car and bullion assays, and it is the superintendent of the mine has gone still farther and gives the width and assay values of all ores found. Bob Morrow who is reputed to control the Overman, may be a shrewd and conscienceless man in stock operations, yet he evidently aims to conform to the law under which the Overman Mining Co. incorporated. Let other mining companies do likewise, and thereby save the dummy directors lawsuits and damages.

Geo. R. Wells, attorney for the Hale & Norcross Mining Co., informs the writer that at the next meeting of the directors of the company a motion will be made and adopted requiring the superintendent of the mine to take and report car sample assays of all ore sent to mill, and also institute other reformatory measures so as to conform to the law. The new management of Hale & Norcross have cut off several supernumeraries, not the least of which is that of Assistant Superintendent (Pendergast's position), who drew \$250 a month. Mr. Wells, as auditor of the company, refused to audit quite a number of bills. The shareholders of the mine are to be congratulated on the auspicious manner in which the new management take solid control of the mine. Mr. Wells says that if they can secure control of the Savage mine then a large saving in milling charges can be made. The Mining Stock Association and the Brokers' Combine, we are informed, will stand in with the Hale & Norcross management, so as to try and have the Savage mine pass into the latter's control. This shows that these two organizations are not actuated by mercenary motives, but by an earnest desire to rectify the abuses on the Comstock brought on through the peculiar system of milling in that district. It now looks as if the new management of the Hale Norcross mine is fretting out many abuses which stand out in bold relief and puts to the blush even the guileless heathen Chinamen. There is no doubt but the uncovering of the various means devised to make money for a limited few at the expense of the shareholders will be instrumental in causing Messrs. Flood and Mackay to have the superintendents of the mines they control conform more rigidly to the law, so as to disarm any adverse criticism and allay any suspicion that "things are not as they should be."

The share market opened firmer this morning, but with trading light. After one of the most advanced slights. The market acts very much like a person recovering from a drunk; perhaps the manipulators are, and, if so, it is to be hoped that when fully sober they will give more life to the market. In outside shares trading continues light, with the Quijotos and Razor Blades sadly neglected. The latter may yet surprise the street by a sudden upmove.

Why should not the new management of Hale & Norcross Mining Co. call a meeting of directors at once and authorize them to instruct the superintendent to give car sample assays, and report all else required by law? It should not surprise any one to learn of suits for damages being brought against the directors of several mines for neglecting to have their agents, the superintendents, comply with the law which requires stockholders to be informed. Until mine managers conform to the law and have their dummy directors require the mine superintendents to conform to the law in making their weekly reports, it seems useless to give favorable news from the Comstock district, for until the reforms demanded are carried into practice the dealing in shares will be a losing game to outsiders, for it will continue to fall into the hands of the few who are in the secret. The mines they are opening up the rich ore found to the west, but not an encouraging word regarding the work is given in the weekly letters. Paid writers and others are attracting attention from mines in which the best results are expected to mines that are more or less worked out; but then, in the latter mines, a strike of ore is taken advantage of to bull outsiders with a false tale that they are better than others. It would not surprise the writer if a strike is reported soon in one or two of the mines.

From the outside mines our advices report that the Silver King mill is being put in place, and that the work in one or two of the Quijotos mines ought to show well soon. In the Bodie district it is said that much of the work which is being done in Bodie and Bodie is kept back, or at least not allowed to reach the public. This work, it is claimed, is quite important. The Mono ore goes nearly \$50 a ton, battery assay; it is gold. The standard letters are very encouraging.

San Francisco Metal and Coal Market.

THURSDAY, April 7, 1892.

ANTIMONY.		STEEL.	
Per lb.....	@ 14	English, lb.....	16 @ 20
Refined, in case lots @	8	Canton tool.....	9 @ 9
Powdered, do @	8	Pick dynamo.....	8 @ 10
Concentrated, do @	7½	Machinery.....	4 @ 5
All grades jobbing at advance		Do Oak.....	4 @ 5
COPPER.		TINPLATE.	
Bolt.....	22 @	S. V. steel grade	
Sheathing.....	22 @	14x20, spot.....	@ 6 00
Ingot, jobbing.....	@ 14½	Tharcoal, 14x20.....	@ 6 00
Do, wholesale.....	@ 13½	Do roofing, 14x20.....	@ 6 00
Fire Box Sheets.....	22 @ 24	Do, do, 20x22.....	@ 12 00
IRON.		TIN.	
Bar, base.....	3 @	Spot @ lb, irreg.	
Norway, base.....	4 @ 5½	West Hart.....	21 @ 22
PIG IRON.		COAL.	
Eglinton @ ton.....	25 00	Spot from yard—PER TON.	
Glenagrock.....	25 00	Wellington.....	\$3 00
Am. Soft, No. 1.....	25 00	Greta.....	7 25
Oregon Pig.....	30 00	Nanaimo.....	7 25
Guist Sonoma.....	30 00	Gilman.....	6 50
Clay Lane White.....	24 00	Qoos Bay.....	6 00
Langlois.....	25 00	Cannel.....	8 50
Thorndike.....	26 00	Egg, hard.....	14 00
Carlsberg.....	26 00	Cumberland, in sacks.....	15 00
Carlsberg.....	26 00	Castile.....	15 00
Carlsberg.....	26 00	Walsend.....	7 50
OHREME IRON ORE.		SCOTCH SPIRIT.	
Per ton.....	10 00 @	Brymbo.....	7 50
LEAD.		SILVER.	
Pig.....	@ 4½	Per 100 lb.....	80 00
Bar.....	@ 6	Australian.....	@ 7 00
Sheet.....	@ 7	Liverpool Steam.....	@ 7 00
Pipe.....	@ 6½	Scotch Spirit.....	6 50 @
DISCOUNT.		LEIGH LUMP.	
(Discount 10% on 500 bag.)		Leigh Lump.....	12 00 @
Drop, @ bag.....	1 80 @	Cumberland.....	@ 13 00
Back, @ bag.....	2 00 @	Egg, hard.....	@ 12 00
Chilled, do.....	@ 20	West Hart.....	@ 7 50
QUICKSILVER.		GOKE.	
Home trade, pr.		English, to load.....	\$3 00 @ 9 00
Do, do.....	@ 33 00	Do, spot, in bulk.....	10 00 @
For export.....	@ 43 00	Do, in sacks.....	12 00 @

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		ASSESSMENTS.		SECRETARY.	
Andes M Co, Nevada.....	33.....	250.....	March 8, April 11, April 29.....	J W Twigg, 39 Montgomery	
Best & Belcher M Co, Nevada.....	51.....	375.....	March 3, April 7, April 29.....	L Osborn, 39 Montgomery	
Belcher M Co, Nevada.....	43.....	500.....	March 8, April 15, May 3.....	O L Perkins, 331 Pine	
Bullion M Co, Nevada.....	37.....	250.....	March 17, April 21, May 11.....	E R Grayson, 331 Pine	
Consolidated M Co, Nevada.....	2.....	750.....	March 30, May 3, May 25.....	A S Grob, 414 Calif	
Con New York M Co, Nevada.....	9.....	100.....	March 10, April 12, May 5.....	C E Elliott, 309 Montgomery	
Croft Point M Co, Nevada.....	57.....	500.....	March 15, April 18, May 10.....	J Newland, 331 Pine	
Fall River Con M Co, Nevada.....	7.....	20.....	Feb 24, April 2, April 25.....	L Cass, 115 Front	
Gold & Kleece Gravel M Co, California.....	16.....	85.....	Oct 30, Mar 24, May 7.....	W J Gleason, Pheasant Block	
Golden Prize Con M Co, Nevada.....	6.....	250.....	Feb 24, May 7, May 28.....	O D Bennett	
Gld Mountain M Co, California.....	2.....	42.....	March 23, May 3, May 23.....	J F Curtis, 213 Grant Avenue	
Hale & Norcross M Co, California.....	101.....	500.....	Mar 24, Apr 28, May 20.....	A E Thompson, 319 Montgomery	
Head Centre and Tranquility Co, Arizona.....	4.....	30.....	March 14, April 13, May 12.....	J W Pew, 310 Pine	
Kentuck Cons M Co.....	3.....	100.....	March 22, April 26, May 19.....	J W Pew, 310 Pine	
Keystone Con M Co, California.....	2.....	50.....	March 9, April 19, May 9.....	J H I Ham, 310 Pine	
Locomotive M Co, Arizona.....	15.....	50.....	April 7, May 9, May 27.....	A H Fish, 309 Montgomery	
North Bell M Co, Nevada.....	19.....	200.....	March 4, April 5, May 3.....	J W Pew, 310 Pine	
Occidental Cons M Co, Nevada.....	10.....	20.....	April 8, May 9, May 31.....	A K Durbin, 309 Montgomery	
Original Keystone M Co, Nevada.....	9.....	100.....	March 4, April 4, May 7.....	F E Lyle, 330 Pine	
Peer M Co, Arizona.....	12.....	100.....	Feb 24, March 26, April 28.....	A Waterman, 303 Montgomery	
St. Hill M Co.....	4.....	50.....	Feb 24, March 24, April 15.....	Chas A Hars Stenart St	
St. Hill M Co, Nevada.....	3.....	100.....	March 31, May 5, May 25.....	D O Bakes, 39 Montgomery	
Slip Hill Cons Quicksilver Co, California.....	3.....	100.....	March 15, April 23, May 19.....	E F Stone, 306 Pine	
Ulrich Con M Co, Nevada.....	14.....	20.....	March 8, April 11, April 29.....	A H Fish, 309 Montgomery	
Weldon M Co, Arizona.....	5.....	50.....	Feb 9, Mar 15, Apr 14.....	A Waterman, 303 Montgomery	
COMPANY AND LOCATION.		MEETINGS.		SECRETARY AND OFFICE IN S. F.	
Bulwer Con M Co, California.....	Annual.....	L Osborn, 309 Montgomery.....	April 13		
Champion M Co, Nevada.....	Annual.....	T Wetzel, 32 Sansome.....	April 9		
Cover Bay Coal Co, Oregon.....	Annual.....	N V Huntington, Fourth and Townsend.....	April 13		
Great Western Quicksilver M Co, Idaho.....	Annual.....	309 Pine.....	April 13		
Gore Mining Co, Nevada.....	Annual.....	E McF Doble, 13 Fremont.....	May 10		
St Charles Hill M Co.....	Annual.....	J F Holling, 113 Liedesdorf.....	April 9		
COMPANY AND LOCATION.		LATEST DIVIDENDS.		SECRETARY AND OFFICE IN S. F.	
Cons Cal & Virginia M Co, Nevada.....	Amount.....	50.....	A W Haver, 309 Montgomery.....	Payable.....	
Eureka Con M Co, Nevada.....	Amount.....	25.....	H P Bush, 101 Sansome.....	Jan 5	
Great Western Quicksilver M Co.....	Amount.....	25.....	A Halsey, 328 Montgomery.....	Oct 1	
Pacific Coast Borax Co, California.....	Amount.....	100.....	A H Clough, 230 Montgomery.....	April 11	
Standard Cons M Co, California.....	Amount.....	10.....	J W Pew, 310 Pine.....	April 26	

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING MARCH 15.	WEEK ENDING MARCH 22.	WEEK ENDING MARCH 29.	WEEK ENDING APRIL 6.
Alpha.....	30.35	35.40	40.40	45.100
Alta.....	80.80	85.90	90.90	95.100
Andes.....	40.40	45.50	50.50	55.40
Belcher.....	90.90	95.100	100.100	105.80
Belle Isle.....	20.20	25.20	25.25	25.25
Best & Belcher.....	2.00	2.10	2.30	2.40
Bodie.....	40.40	45.40	50.40	55.40
Bulwer.....	40.40	45.40	50.40	55.40
Commonwealth.....	10.10	15.15	15.15	15.15
Con. Va. & Cal.....	40.40	45.40	50.40	55.40
Challenge.....	80.80	85.80	90.80	95.80
Chollas.....	95.95	100.100	105.100	110.100
Consolidated.....	2.00	2.25	2.30	2.40
Con. Imperial.....	40.40	45.40	50.40	55.40
Crocker.....	40.40	45.40	50.40	55.40
Croft Point.....	40.40	45.40	50.40	55.40
Crocker.....	40.40	45.40	50.40	55.40
Del Monte.....	35.35	40.40	45.40	50.40
Eureka Con.....	2.00	2.10	2.30	2.40
Excelsior.....	35.35	40.40	45.40	50.40
Grand Prize.....	1.75	2.00	2.10	2.30
Gould & Curry.....	1.25	1.50	1.60	1.80
Hale & Norcross.....	1.00	1.50	1.75	1.80
Julia.....	25.25	30.30	35.35	40.40
Justus.....	15.15	20.20	25.25	30.30
Kentuck.....	15.15	20.20	25.25	30.30
Lady Wash.....	15.15	20.20	25.25	30.30
Mono.....	75.75	80.80	85.80	90.80
Mexican.....	1.75	2.00	2.10	2.30
Monarch.....	10.10	15.15	20.20	25.25
North Belle Isle.....	10.10	15.15	20.20	25.25
Nev. Queen.....	25.25	30.30	35.35	40.40
Occidental.....	30.30	35.35	40.40	45.40
Oregon.....	2.70	3.00	3.20	3.50
Overman.....	40.40	45.40	50.40	55.40
Potosi.....	90.90	105.100	110.100	115.100
Peerless.....	40.40	45.40	50.40	55.40
Justus.....	15.15	20.20	25.25	30.30
Sage.....	1.00	1.50	1.75	1.80
S. B. & M.....	35.35	40.40	45.40	50.40
Sierra Nevada.....	1.55	1.75	1.80	2.00
Silver Hill.....	10.10	15.15	20.20	25.25
Scorpion.....	1.40	1.65	1.75	1.80
Union Co.....	1.40	1.65	1.75	1.80
Utah.....	25.25	30.30	35.35	40.40
Yellow Jacket.....	1.00	1.20	1.30	1.50

Assessment added.

Eastern Metal Markets.

NEW YORK, April 6.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	39½	82½	11 75	4 20	19 80
Friday.....	39½	81½	11 75	4 20	19 85
Saturday.....	40½	81½	11 75	4 20	19 85
Monday.....	39½	81½	11 75	4 20	19 85
Tuesday.....	39½	81½	11 75	4 20	19 85
Wednesday.....	39½	81½	11 75	4 20	19 90

Copper is very strong at 11½ cts bid. Borax continues in buyers' favor. Lead is firmer. Pig tin is steady with a fair demand reported. Pig iron is unchanged.

WOOD RIVER—The Queen of the Hills mine, located about one mile from Bellevue, Idaho, was sold a few days ago to an English company with a capital of \$200,000. This property has been in the hands of Salt Lake and New York capitalists for several years past and has paid dividends aggregating a quarter of a million dollars without going beyond 500 feet below the surface. It ceased operations 18 months ago and was placed in the English market for sale. The property is equipped with the finest hoisting machinery and a milling plant, and notwithstanding the prevailing low price of silver it is expected that the mine can be worked with a good margin. The result of the winter's development in the mines in the Wood river region is most gratifying. Some 20 mines in the immediate neighborhood are all showing up well, and despite the deplorable condition of the money market, mining interests are experiencing a great revival.

The discovery of rich gold placers in Sonora, Mexico, is exciting mining circles in Northern Mexico and adjacent territory in the United States. A great many gold seekers are reported going to the country. There is very little water in this region, and water is also scarce leading along the road to the placers. Numerous hardships are reported from prospectors coming in.

California Fish.

At a meeting of the directors of the Mechanics' Institute this week, during

The California Miners' Association.

Officers, Committees and Constitution
and By-Laws of the State
Organization.

As the natural outgrowth of the State Mining Convention, and in accordance with the resolutions of that body, the California Miners' Association has been organized.

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R. G. Hart, Shasta.	Wm. Ireland Jr., S. F.
Frank McLaughlin, Butte.	J. B. Hobson, Placer.
Hon. J. K. Luttrell, Sonoma.	

DELEGATES TO WASHINGTON.

Hon. Niles Searles, of Nevada County
Hon. J. K. Luttrell, of Sonoma County.
Robert McMurray, of Nevada County.
J. B. Hobson, of Placer County.

THE CONSTITUTION.

ARTICLE I.

SECTION 1. This organization shall be known as the California Miners' Association.

Sec. 2. The objects of this Association shall be to protect, develop and foster the mining industry of the State of California in all its branches.

ARTICLE II.

SECTION 1. The officers of this organization shall be a President, Vice-President, Secretary, Assistant Secretary, Treasurer, and an Executive Committee, consisting of eleven members elected at large, and one additional from each county represented in the Association, to be selected by the President of this Association.

Sec. 2. All officers to serve for the period of one year, or until their successors are elected or appointed.

Sec. 3. The President and Secretary of the Association shall be ex officio President and Secretary of the Executive Committee.

Sec. 4. There shall be an annual meeting of this Association held in San Francisco on the second Monday in October in each year.

ARTICLE III.

SECTION 1. The Executive Committee of this Association shall have full power to transact all business of the Association, except such as may be transacted at any General Meeting of the Association.

Sec. 2. The President shall preside at all meetings of the Association, sign all drafts and checks authorized to be drawn on the Treasurer, and perform such other duties as are herein prescribed, as usually pertain to that office. In the absence of the President, a Vice-President shall perform the duties of that office, taking precedence in the order of their appointment, unless otherwise ordered by the Association.

Sec. 3. It shall be the duty of the Secretary to keep full and correct minutes of all meetings of this Association, and of the Executive Committee, and shall render annually to the Association a full report of all the transactions of his office; receive all moneys of the Association, paying the same to the Treasurer and taking his receipts therefor, and perform such other duties as may be required of him; either by the Association or the Executive Committee thereof. The Secretary shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

Sec. 4. It shall be the duty of the Treasurer to receive all moneys of the Association, and safely keep the same, and pay the same only upon orders drawn by the President and countersigned by the Secretary. He shall render an annual report to the Association, and upon the request of the President of this Executive Committee, shall, at any time, furnish to said committee, a statement of the condition of the funds of the Association. The Treasurer shall give bonds in such sum as the Executive Committee may determine, for the faithful performance of his duties, such bond to be approved by the President.

ARTICLE IV.

SECTION 1. The headquarters of this Association shall be at the city and county of San Francisco.

Sec. 2. It shall be the duty of the Vice-Presidents of this Association to at once proceed to the formation of a County Organization in their respective counties. Such County Organizations shall be recognized as branches of this Association.

Sec. 3. All persons friendly to the mining interests are eligible to become members of this Association. In the event that there is no County Organization, such person may note with the State Association by forwarding his name to the Secretary thereof, and paying a membership fee of one dollar (\$1.00), upon which he shall be furnished by the Secretary with a certificate of membership. But this shall not constitute him a delegate to the meetings of the Association. County Organizations may admit nonresidents as members.

Sec. 4. Each County Organization shall be entitled to one delegate to the State Conventions for each ten members, to be selected as each County Organization may determine.

This Constitution may be amended at any General Meeting of the Association upon a vote of the majority of delegates present.

Adopted by this Executive Committee, Jan. 22, 1892.

BY LAWS.

SECTION I.—The Executive Committee shall be authorized to appoint from among themselves such subcommittee as they may determine. They shall fill all vacancies of the officers of the Association or members of any committee. The Executive Committee shall have power to remove any officer of this Association who is derelict in his duty, upon a two-thirds vote of all the members present at such meeting, provided that no officer shall be removed until he shall have been notified of the intended action of the committee, and afforded an opportunity to be heard.

Sec. II.—The Executive Committee may, from time to time, levy such assessments upon county organizations as the necessities of this Association may require. Any county organization delinquent at the time of the annual meeting, on account of any assessments levied 90 days preceding such date, may be deprived of representation.

Sec. III.—All parliamentary questions shall be determined in accordance with Cushing's Manual, unless otherwise ordered by the Association.

Sec. IV.—Unless otherwise ordered, the President shall appoint all committees of this Association.

Sec. V.—The meetings of the Executive Committee shall be held at such times as they may determine. Special meetings of said committee may be called by the President whenever deemed advisable, and upon the written request of any five members of the Executive Committee the President shall call a meeting thereof.

Sec. VI.—At all meetings of the Executive Committee seven members shall constitute a quorum for the transaction of business. Whenever practicable, each member of the committee shall be notified personally or by mail of each intended meeting.

Sec. VII.—The Secretary and Treasurer shall receive such compensation for their services as this Executive Committee may, from time to time, determine.

These by-laws may be amended at any annual meeting of the Association, upon a vote of the majority of delegates present.

Adopted by the Executive Committee Jan. 22d, 1892.

The headquarters of the California Miners' Association have been established at room 23, No. 331 Pine St., S. F., Stock Exchange Building.

Assessment Notices.

KEYSTONE CONSOLIDATED MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Amador City, Amador Co., Cal. Notice is hereby given that at a meeting of the Board of Directors, held on Wednesday, the 9th day of March, 1892, an assessment (No. 2) of Two Dollars and Fifty Cents (\$2.50) per share was levied upon the capital stock of this corporation, payable immediately in U. S. gold coin, to the Secretary, at the office of the company, No. 310 Pine St., room 43, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of April, 1892, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Monday, the 9th day of May, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.

By order of the Board of Directors, J. H. ISHAM, Secretary, Office, No. 310 Pine St., Room 43, San Francisco, Cal.

GOVER MINING COMPANY.

Notice of Annual Meeting of Stockholders.

THE ANNUAL MEETING OF THE STOCKHOLDERS of the Gover Mining Company will be held at the office of the company, No. 13 and 15 Fremont Street, San Francisco, California, on TUESDAY, the Tenth day of May, 1892, at 1 o'clock P. M. of that day, for the purpose of electing five Directors to serve until the next annual meeting and until their successors are elected and qualified, and for the transaction of all other business that may be brought before said meeting.

By order of the Board of Directors, ROBERT MCF. DOBLE, Secretary.

BOOKS ON ASSAYING.

By C. H. AARON.

Part I.—Gold and Silver Ores.

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This work is written by an experienced metallurgist who has devoted many years to assaying and working precious ores on the Pacific side of the American Continent. He writes whereof he knows from personal practice, and in each plain and comprehensive terms that neither the scientist nor the practical miner can mistake his meaning.

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Table of Contents:

Preface; Introduction; Implements; Assay Balance; Materials; The Assay; Preparation of the Ore; Weighing the Charge; Mixing and Churning; Assay Litharge; Systems of the Crucible Assay; Preliminary Assay; Dressing the Crucible Assays; Examples of Dressing; The Melting in Crucibles; Scorchification; Cupellation; Weighing the Bead; Parting; Calculating the Assay; Assay of Ores Containing Coarse Metals; Assay of Roasted Ore for Solubility; To Assay a Cupel; Assay by Amalgamation; To Find the Value of a Specimen; Tests for Ores; A Few Special Minerals; Solubility of Metals; Substitutes and Expeditious; Assay Tables.

This volume embraces 130 litho. pages, with illustrations, well bound in cloth; 1889. Price, \$1, postpaid. Sold by DEWEY PUBLISHING CO., Publishers, No. 220 Market Street, San Francisco.

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One of the methods given for the Assay of Copper is new, original and exact, as is also one of the processes for Zinc. This book contains 161 pages with illustrations, and is strongly bound in cloth. Much of the original text is replaced by new matter.

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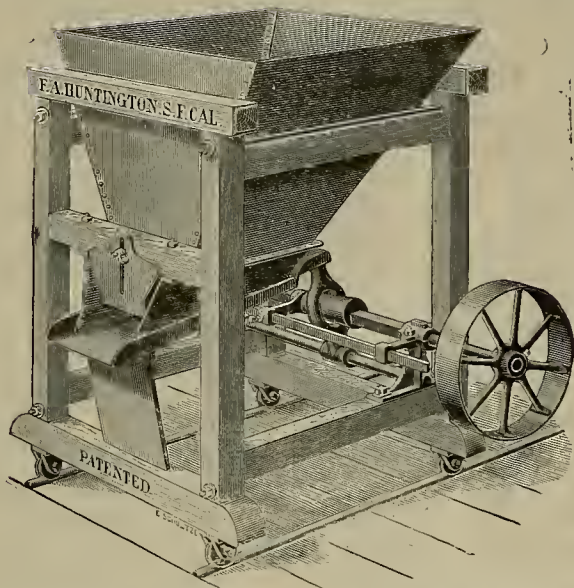
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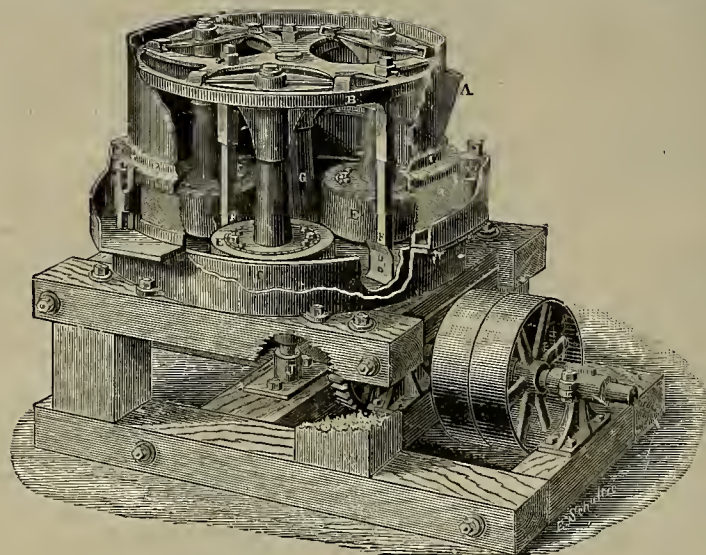
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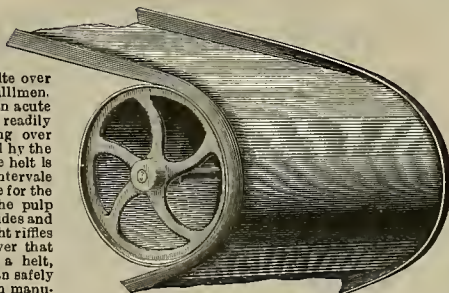
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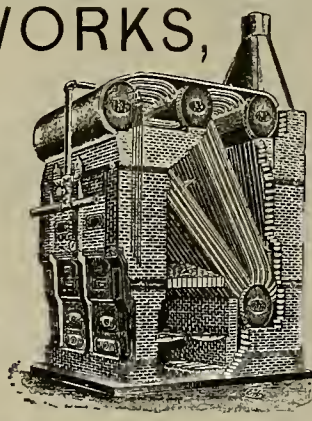
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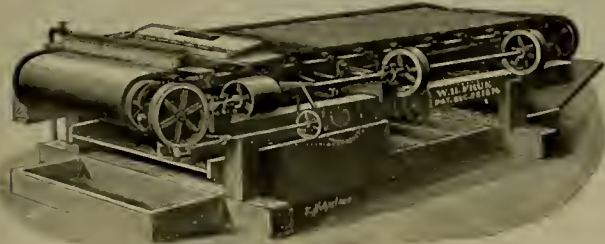


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 In order to give an idea of the work they are doing here I will
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Signed] Supt North Star and Original Empire Mining Co.
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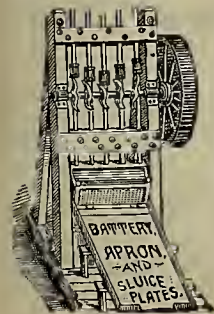
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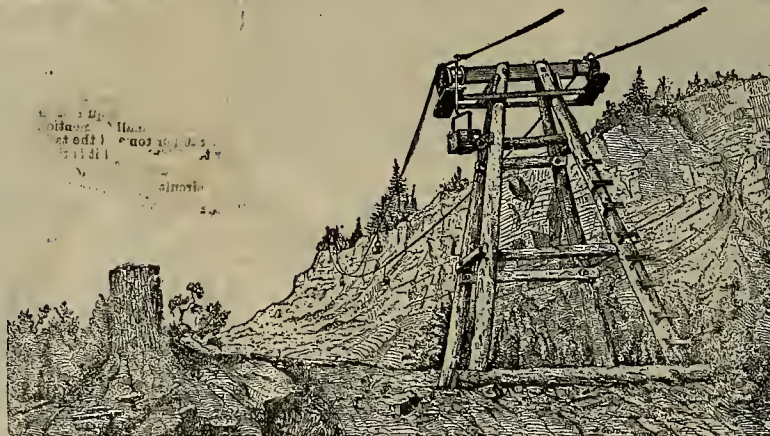
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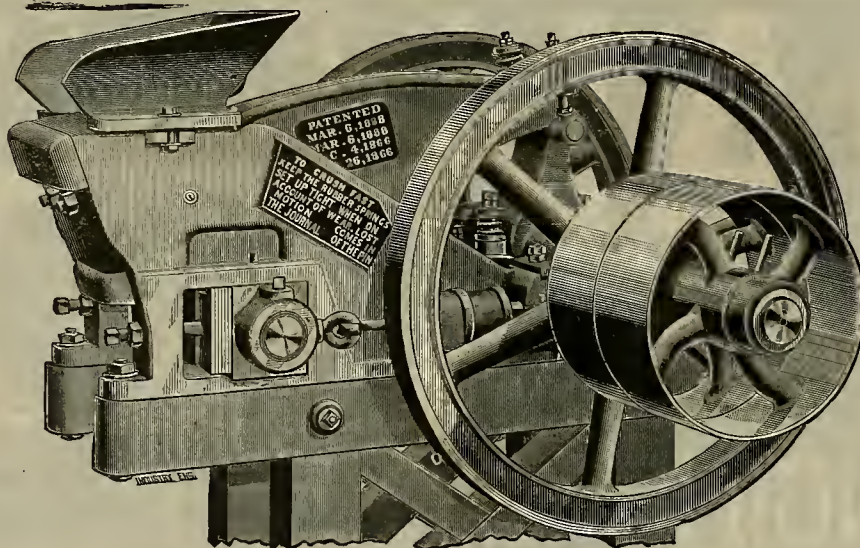
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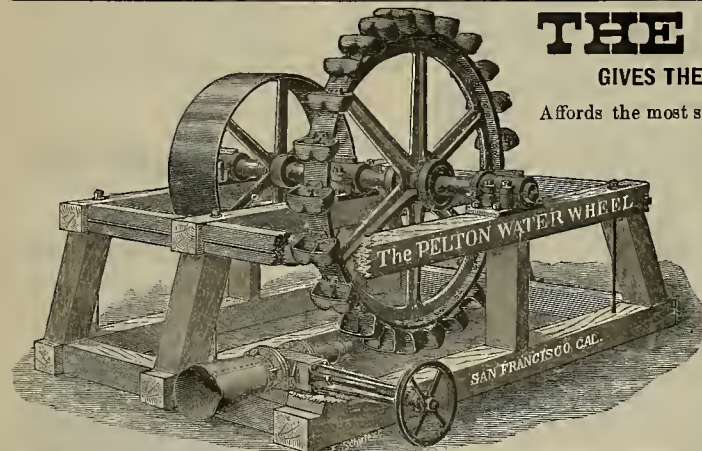
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MINING AND SCIENTIFIC PRESS.

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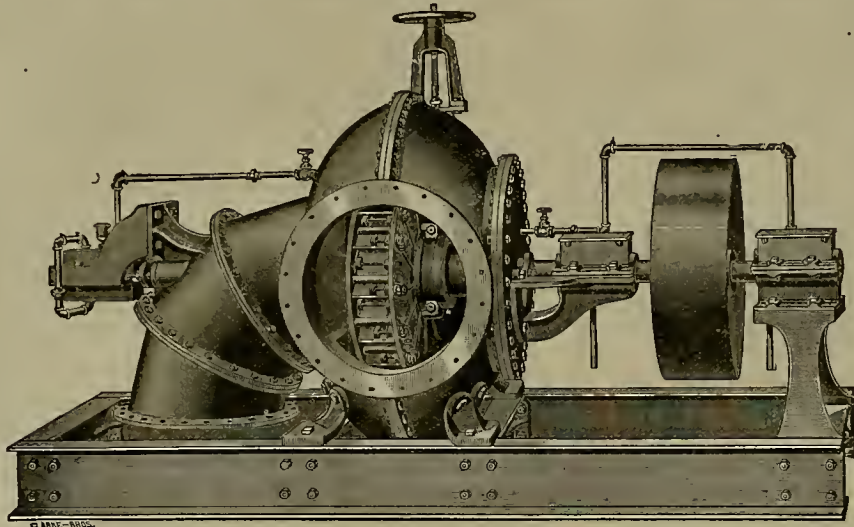
Montana Copper Ore.

In a paper on "The Copper Resources of the United States," read by James Douglass of New York before the American Institute of Mining Engineers, the author states that the principal mines of Butte, Montana, have been opened on a lode which has proved to be continuous and productive for over three miles. The principal mines succeed one another from west to east as follows (see engraving): Gagnon, Original, Parrott, Anaconda, St. Lawrence, Mt. View, Shannon, Colusa and Hattie Harvey. The gangue of the vein is granitic and softens to a very considerable depth. It contains disseminated particles of ore, but most of the ore is derived from large imbedded masses. One of these in the Anaconda is said to attain a width of 150 feet of solid mineral. Two, or perhaps three, parallel veins, or as many chains of ore masses in one very wide vein, are traceable throughout its extent. Everywhere the copper carries silver in proportions varying from two ounces per unit of copper to less than one-half ounce per unit. The proportion of silver to copper is greater in the western section of the vein than in its central and eastern sections. The ores of the Gagnon mine are smelted into rich argentiferous matte at the Williams Works, which ship their product to the Boston and Colorado Smelting Company of Argo, Colorado. The Parrott ores contain about sixty ounces of silver to the ton of copper. The average silver contents of the Anaconda, Mountain View and Colusa ore is less. Both the Chambers Syndicate and the Boston and Montana Company, however, make rich silver matte, but not from unmixed ores of the great lode.

In the Gagnon and Original on the west and Colusa on the east, the copper ore came to the surface, whereas in the Anaconda and Mt. View, which crown the hill several hundred feet above the terminal mines, the surface ores, to a depth of 400 feet, carry some silver but no notable quantity of copper. At about

that depth, however, great bodies of oxysulphurets and erubescite were met with in the Anaconda, from which, in the early days, ores running 50 per cent and over in copper were mined by tens of thousands of tons.

in the valleys and on the flanks of the hill. But their depth and richness there are not as great as they are on the summit, where it seems as if the copper leached out of the 400 feet of depleted vein had been concen-

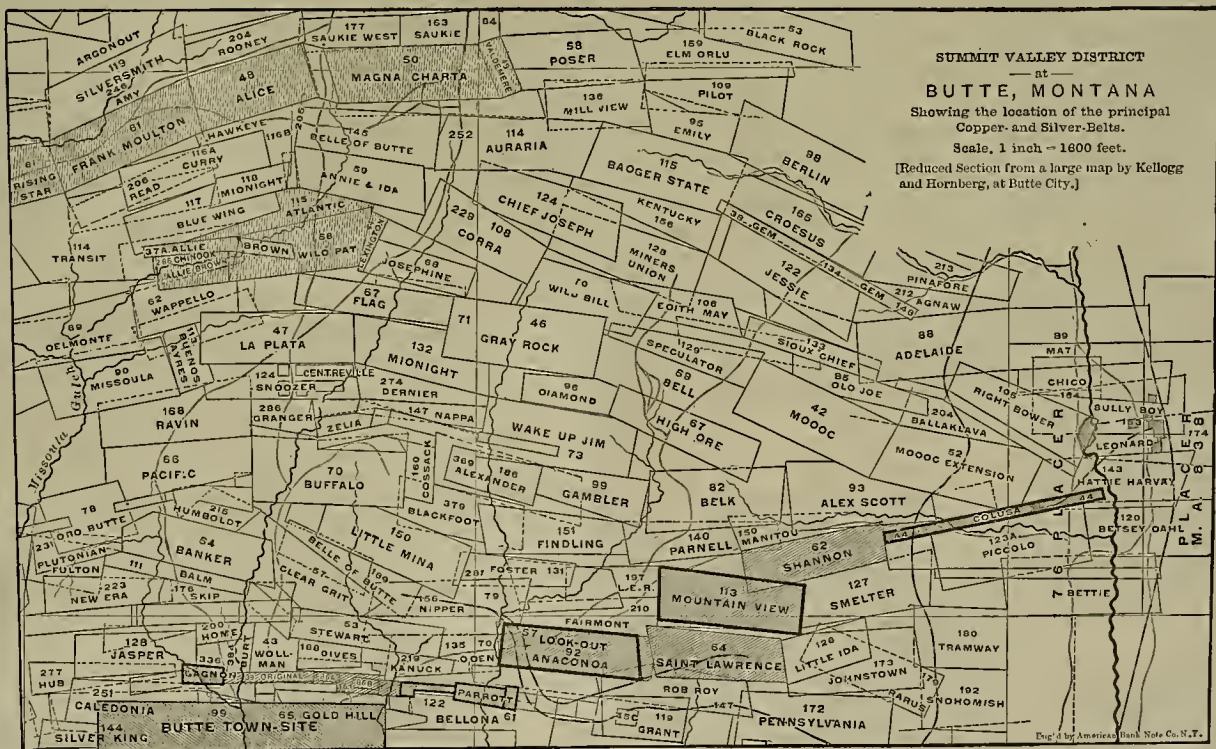


LEFFEL'S DOUBLE STANDARD TURBINE MINING WHEEL.

The Leffel Mining Wheel.

The Leffel standard double water-wheel for mining purposes is mounted on an iron frame as shown. There is on this wheel a combination of two independent sets and kinds of buckets, one a vertical and the other a central discharge, each entirely different in its principle of action upon the water, yet each wheel or series of buckets receiving its water from the same set of guides at the same time. The water, however, is acted upon but once, since half the water admitted by the guides passes to one wheel and the other half to the other, being nicely divided and separated by the partition or diaphragm between the two wheels, the water leaving both wheels or sets of buckets at the same time and as quickly as possible. These two sets of buckets are so combined as to make really but one wheel; that is, both are cast in one piece and placed upon the same shaft. By this arrangement there is admitted the greatest volume of water, to a wheel of any given size, consistent with its economical use, at both full and part gates, and at the same time the greatest area for the escape

of water is secured. The surface on the wheel is thus reduced to a minimum as compared with the quantity of water used. There are a good many thousands of the Leffel wheels in use in the various industries, the type shown being especially adapted for mining purposes.



CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eo.

Car and Battery Sample Assays.

BODIE, CAL., April 9, 1892.

TO THE EDITOR:—In your issue of March 19th I note I am taken to task in your "Mining Share Market" column for failure to report car or battery sample assays "as required by law." The Civil Code reads as follows: "It shall also be the duty of the superintendent to file with the Secretary a weekly statement, under oath, showing * * * the amount (of ore) sent to mill for reduction, its assay value, the amount of bullion received," etc.

I do not find anything about car or battery sample assays. In the case of the Standard ore, neither of these would comply with the law, which demands the assay value of the ore, not an assay value, such as car or battery samples would furnish.

Over 60 per cent of the value of the ore from the Standard mine consists of free gold, while nearly 90 per cent of our entire product is obtained from the batteries and apron plates. Consequently a battery sample will not give the assay value of the ore, as an unknown quantity of coarse gold remains inside the mortars. Neither will a car sample do so, not only on account of the difficulty of getting an average sample from coarse and fine rock mixed in unequal proportions, but because of the absolute impossibility of getting a representative sample of a free gold ore existing in that state. How, then, can the assay value of the ore be arrived at?

Only by adding together the value of the bullion product of the batteries and apron plates, the value of the concentrates produced from our Frue vanners and the value of the escaping tailings, which latter can be accurately determined from daily assays, as the element of danger in sampling—the free gold—is eliminated. This sum, divided by the number of tons of ore crushed during the month, gives the true assay value of the ore. Of course this can be done but once a month after the regular cleanup, and I inclose you a copy of our mill report for the month of January last, showing the form in which this information is put before the stockholders. This complies with the spirit as well as the letter of the law, and gives accurate and not misty information.

THOS. H. LEGGETT,

Pres. and Manager Standard Con. M. Co.

The January statement of the Standard Mining Co. is a decided improvement on the reports furnished by any other mine, either in the Bodie or Comstock district, and Mr. Leggett deserves credit for the concise manner in which he gives the bullion output. It is to be presumed that the company own their mill, but aside from this the Superintendent is not expected to construe the laws of California nor to withhold from shareholders any knowledge to which they are entitled to under the law. The weight and assay value of the ore as sent from the mine to the mill is as important knowledge for shareholders as it is to the man or men who manage the mine, and it is the superintendent's duty as an agent for those who have entrusted him with their property to keep just such a check and to notify them of that fact, in order that they may know if he is performing his trust in good faith. Superintendents are in the employ of the shareholders whom they represent, and they have a duty to perform, and that duty is to report the facts as they exist—that is, to give the weight and assay value of the ore which passes through their hands as superintendent. This is the more important when the mill is not owned by the mining companies.

To understand this position more clearly it is necessary not only to quote that section of the law referred to by Mr. Leggett but to explain why the law was enacted.

The Act of March 30, 1874 was amended April 23, 1880, and made to read as follows:

Section 587, Civil Code, Section 1: It shall be the duty of the Superintendent to file with the Secretary a weekly statement, under oath, showing the number of men employed, etc. * * * He shall attach to such account a full and complete report, under oath, of the work done in said mine, the amount of ore extracted, from what part of the mine taken, the amount sent to mill for reduction, its assay value, * * * It shall also be his duty to forward to the office of the company a full report under oath, of all discoveries of ores or mineral-bearing quartz made in said mine, whether by hor-

ing, drifting, sinking, or otherwise, together with the assay value thereof. * * *

This amendment was introduced by Senator Felton to correct the abuse of the Comstock mill ring.

The mines were owned by shareholders in California while the mills were owned by a mill ring in Nevada, and the mine had no check upon the mills except through car sample assays taken at the mine previous to shipping. The amendment was made to the act of March 1874 to compel superintendents to keep a record of the ore (number of tons) sent to the mills and its assay value, to be used as a check against the mills. Again, superintendents were, by this amendment, forced to report all ore found in the mine and its assay value as a further check against mill owners in making their returns to the mining companies for which they were milling ore.

The Comstock mill ring, which also controls the mines through dummy directors, has persistently refused to obey the law requiring the filing of the assay value of the ore at the mine, and instead, have simply furnished the mining companies with the pulp assay of the mill. These pulp assays have been made to order by the mill ring, and in many instances have been so manipulated that the mine has received less than 50 per cent of its assay value and in one instance not more than 35 per cent.

In early days on the Comstock the mining companies hoisted their ore, had it sampled and sold it to the mills for 65 per cent of its assay value. To day the mills are owned by one party and the mines are owned by everybody. The mill rings buy the proxies of brokers, elect dummy directors, and these directors hire a superintendent, like the one at the Hale & Norcross, who turns the ore over to the mills without any check whatever. The president of the mine, like the ex-president of the Hale & Norcross, is given certain profits to keep his mouth shut and as a result they return about 50 per cent of the value of the ore to the mine.

To correct just such abuses as the above, the Felton Amendment was enacted, and had the superintendent of the Hale & Norcross been forced to report his mine and car sample assays to the stockholders in San Francisco, at least one million dollars would have been paid in dividends in place of being carried off by the mill ring.

The ex-president of Hale and Norcross says the law means pulp assays of the mill taken by employees of the mill ring. How could the superintendent get a pulp assay of ore "discovered" by boring, drifting, sinking, or otherwise, when only a small sample is sent to the office of the assayer from the drill borings, or a few selected samples taken from across the face of a drift? The law is plainly written, and its object has been explained. By evading it, the stockholders of Hale & Norcross were robbed of \$10 per share, which should have been paid in dividends.

Trans-Sierra California.

A Land of Contrasts and Extremes.

SAN FRANCISCO, April 9, 1892.

TO THE EDITOR:—What has come to be known as, and very properly designated, Trans-Sierra California consists of that portion of the State lying beyond the Sierra Nevada mountains, and extending from the summit of that range northeast to the State of Nevada. It is a region of imperial dimensions, being fully 160 miles long by nearly 100 wide, comprising an area of 25,000 square miles—16,000,000 acres.

This outlying country is marked by many physical peculiarities, both climatic and geographical. Here, with a single exception, are found the highest mountains, also the lowest lying lands in the United States. Standing on the western border of this Trans-Sierra is Mount Whitney, having an altitude of over 15,000 feet, with a dozen other peaks in the neighborhood nearly as high, while over close to its eastern margin lies Death Valley, depressed far below the level of the sea.

Certain other conditions here contrast

quite as strongly. From the higher mountains, snow never disappears; in the deeper valleys it is seldom, if ever, seen. On the former, the climate even in summer is arctic; in the latter semitropical, almost torrid, the banana ripening in sight of the eternal snow-fields. The water flowing down the canyons is the purest in nature, while that found in the lakes is impregnated with the chloride of sodium and other salts to a degree that renders it unfit for use. The soil, with irrigation, produces abundantly, whereas without this aid, nothing can be grown. One can pass from the extreme of fecundity to the extreme of sterility—out of Paradise into Edom—in a single step. This is the land of the illusive mirage, the blinding sand-storm and the mephitic pools—the land of tempests and calms, of lone buttes, alkali flats and mud lakes—treacherous, bewildering and full of the paths that lead to death.

THE MOUNTAIN SYSTEM OVER THERE

Consists of two principal chains—the White and the Inyo—with many isolated peaks and groups scattered about in every direction, the Sierra Nevada towering a great wall on the west, this like the two main ranges having a northerly and southerly trend. The height of these interior mountains above the great plateau which constitutes the general plane of the country, varies from 2000 to 6000 feet, this plane itself being elevated from 3000 to 4000 feet above tide water. The southerly half of the Inyo takes the name of the Coso mountains, which reach south to their junction with the Slate Range of San Bernardino county. The White mountains lie east of and lap on to the Inyo range, whence they extend north into the State of Nevada. The upper portion of these mountains is composed of a disintegrated rock bleached white as snow—hence the name.

The scenery in that section of the Sierra Nevada situated along and partly within this outlying district is grand beyond description, some of the precipices here exceeding in height any that wall in the valley of the Yosemite. Canyons are met with in this more than Alpine region deeper far than that awful gorge. There occur here waterfalls as lofty as any seen elsewhere, natural bridges spanning great chasms, dark and cavernous alcoves, the craters of dead volcanoes, splintered peaks standing up like church spires, and living glaciers, ever moving but making no progress, these cold and far-removed mountains being the seat of a desolation more absolute than that which reigns over the hot and low-lying deserts to the east.

ITS HYDROGRAPHY.

There is found in this region but a single stream of any magnitude—Owen's river, which traverses more than half its entire length. This river, during the time the snow is melting on the mountains adjacent, carries a large volume of water, much of which is now used for land irrigation. It is fed by numerous tributaries flowing from the Sierra on the west, the mountains to the east affording but little water. There are two considerable lakes in this district—Owen's, a shallow sheet of water 20 miles long and 10 wide, and Mono, 100 miles farther north, covering about the same area but very deep. Nothing can live in either of these lakes, owing to the impurity of the water.

Besides these two bodies of water, there occur here the beds of ancient lakes, now dry or nearly so, these being the sites of the borax deposits and other salines, the most of which are being worked in a large way. To certain of these low basins has been applied the term "sink," because here do the streams that make into them sink and disappear, the water they carry being absorbed by the porous earth or dissipated by the arid and heated atmosphere that for two-thirds of the year here prevails. What is left of these lakes is supposed to be nothing more than the remains of the inland sea that formerly covered this country far and wide, the tops of the present mountains appearing then long and straggling islands in its midst.

TIMBER AND AGRICULTURAL LANDS.

The only lumber forests met with in this country stand on the Sierra Nevada mountains, which from summit nearly to base are covered with a heavy growth of pine. On the mountains to the east only, a scattered growth of pinion juniper and mesquit is found, these all being scrubby trees. Elsewhere, there is no timber of any kind, the few cottonwoods that originally grew along some of the streams being now all cut away. By reason of this scanty forest growth, both lumber and fuel are apt to be dear, no mineral coal of any account having yet been discovered in this country.

About the only land available for tillage consists of the Owen's river bottoms with narrow strips along some of the other streams. A great deal of the soil elsewhere

is rich, and would produce good crops of both fruit and grain could water be had to irrigate it. With sufficient moisture, whether supplied naturally or artificially, nearly everything can be cultivated with success, some astonishingly heavy crops having, under these conditions, been raised. The wild grasses grow sparsely on the mountains and deserts, and luxuriantly on the bottom lands, these grasses furnishing altogether a good deal of excellent pasturage. Concerning the mineral resources of this Trans-Sierra, something will be said at another writing.

H. DEGROOT.

Early Hydraulic Mining.

The First Introduction of Black Iron Pipe.

SAN DIEGO, April 9, 1892.

TO THE EDITOR:—Having read with great interest the article in the MINING AND SCIENTIFIC PRESS of Jan. 30, written by J. F. Talbott, on the early introduction of hydraulic mining in California, I thought my own experience in that line might be of some interest to your readers. I think Mr. Talbott is correct about the date of its introduction, 1853-4; and as soon as it became generally known that dirt could be rapidly moved by the force of water under pressure, everybody that could get water on their claims for that purpose did so. They used common duck hose, made of No. 1 or No. 2 duck, the canvas being 22 inches wide, made after taking out the lap for sewing, a hose about seven inches in diameter, which was used, as near as my memory serves, for nearly two years. For discharge pipes, various kinds and sizes were used, principally made of Russia iron, usually two thicknesses, some long and slim, some short according to the fancy of the person using them. And by the way, this reminds me of a man calling at my shop, in the town of Red Dog in Nevada county, and having in his hand a pipe, about three or four feet long, made of Russia iron; one end, one and a half or two inches in diameter, and four or five inches at the other, which he said he got made at Mr. McLauchlin's shop in Grass Valley. He was on his way to Indiana Hill where he was engaged in mining. I don't know who it was unless it was Mr. Talbott, as I have no recollection of ever seeing the man, before or since.

THE CANVAS AND IRON.

About the year 1855 or '56 I was running a tin-shop in the town of Red Dog, and also engaged in hill mining. There came to me at that time two men from Waukegan, by the names of A. Curry and Thomas McAuliff, the same A. Curry of the famous Gould and Curry mine in Virginia City. They wanted to ascertain the cost of making about one hundred feet of seven-inch iron pipe, of common black iron, and told me what they wanted it for. They had been talking the evening before, in the McAuliff residence, as to what plan they could adopt to prevent their hose bursting so often, when Miss Margaret McAuliff, a sister of Thomas, spoke up and said, "why would not such a thing as that do," at the same time pointing at the stovepipe. The idea struck them at once that that was just the thing they wanted. I went to work and made them their pipe of No. 22 iron, riveting it instead of grooving as is common in making stovepipes. They laid their pipe down the slope of the hill, and drove stakes over it to keep it in place, and then drew their hose inside of it. The object was, to have the iron receive the strain of the pressure of water, and the hose would make it tight, so as not to leak. They found it worked to their entire satisfaction, but after using it a month or two, the iron began to rust, and destroyed the fiber of the cotton hose, and it began to come out in pieces and finally all came out.

I then made them a tapering joint of pipe to put on the lower end to attach the hose to, as they had found that the sediment in the water had filled the joints of the iron pipe so it was perfectly tight, and it was used some time after.

INCREASING SIZE OF PIPE.

When I saw the iron worked so well, I went to work to fit up my own mine with iron pipe, but enlarged upon it by making it 11 inches in diameter and of No. 20 and 22 iron. The heavy iron I put below and the lighter above, then riveted the joints together in sections about 16 feet long, putting them together with slip joints and riveted hooks on each end of the sections, so as to wire them together to keep them from slipping apart.

In order to make it water-tight, I took old hose, cut it in strips two inches wide, and riveted it in all the joints. I also divided the pipe at the lower end, so as to run two hose from the one pipe; and, having

about 90 feet fall, it worked with good results, and people used to come from different sections to see it working.

This, I believe, was the first introduction of black iron pipe for hydraulic mining in California. I had heard that some one had made a seven-inch pipe of galvanized iron and soldered it to make it tight, but it was very expensive in those days for most miners to use. After putting up my pipe, I had all the work I could do making that kind of pipe, but it was soon found out that it was not necessary to put the canvas in the joint, as the sediment in the water soon stopped all leaks that happened to be in the seams.

THE IMPROVEMENTS.

From then on to the time hydraulic mining was stopped by the courts, the miners went on improving with larger pipes, higher fall, thicker iron, with cast iron distributors to run three and four hose from, until they finally seemed to have settled on what is called the Little Giant, which has a universal or knuckle joint to it and a lever attachment to move it about in any direction without the use of any hose whatever, and having a nozzle from four to six inches in diameter, or large enough to run all the water for the sluices through one discharge pipe.

Thus hydraulic mining has advanced step by step from its first inception by Mr. Talbott's simple way of working off loose dirt to its final perfection, when hydraulic mining was stopped by the courts.

THE FIRST DITCH.

There is one thing in Mr. Talbott's communication wherein I think he is a little behind the times, and that is in regard to the first ditch that was constructed for the purpose of hill mining. He speaks in a former communication to this paper of the first discovery of gold in the ancient river channel, or what is termed the blue lead, as having occurred at Yankee Jim's, in Placer county, in the summer of 1851. That statement is entirely correct. When I went to Yankee Jim's in October, 1851, in going from Owl creek to Yankee Jim's, the trail led directly over the claims located by a party of Georgians, who first made the discovery, and they called it Georgia Hill. The discovery was made in this manner: They had been working in Devil's canyon, which was a deep and narrow ravine, and it paid very rich up to a certain point, when it ceased to pay. One of their number discovered on a bench about 50 feet above the bed of the creek, where a sugar pine tree had blown over by the roots, a bed of washed quartz gravel. He took a pan of it down to the creek and washed it out, and, if my recollection serves me, he told me he got 50 cents out of it.

They prospected farther, and found it very rich. They then went to work and split up the old pine tree into slabs and made a chute of it and run the dirt down to the bed of the creek and washed it in a long Tom. That they were doing when I arrived there. They were also working on a ditch to bring the water of Devil canyon down on the hill. I immediately hired out to them to work on the ditch at \$6 a day, and worked until the ditch was completed. This, I think, was the first ditch completed, as the Bear River ditch was not completed until the following summer of 1852. There was another ditch dug that same season from Devil's canyon, on the opposite side, to work the Strong diggings, above the town of Yankee Jim's, and other claims. In the summer of 1852 two other ditches were brought into Yankee Jim's from Brushy canyon.

TRACING THE CHANNEL.

From the first discovery under the roots of the old pine tree on Georgia Hill, the lead or channel was traced north across Devil's canyon to Strong's Hill, thence through the hills to Shirt-Tail canyon, which cut it away entirely; but on the opposite side, at King's Hill, it was taken up again and traced to Elizabethtown, Wisconsin Hill, Iowa Hill. There it was cut off again by the North Fork of the American river, a much larger stream than the others, and cut down to a depth of about 2000 feet below the ancient channel.

It was again found on the north side of that stream, at Indiana Hill, where our friend Mr. Talbott says he worked. From there it was traced to Gold Run, Dutch Flat, Eastman Hill, across Bear river to Little York, across Steep Hollow to Brown's Hill, thence to Red Dog, Independence Hill, across Greenhorn creek to Hunt's Hill Quaker Hill, and through the divide to Deer creek, but that stream was too shallow to cut the channel away, and it was never worked much there for want of drainage; but it continues on through the divide between Deer creek and the South Yuba, where it was discovered at Relief Hill. It then

crops the South, Middle and North Yubas to Galena Hill and Comptonville.

Beyond that, I am not familiar enough with the country to name the places, but have no doubt that it crosses all three of the branches of Feather river, and perhaps still farther north. In going south from Georgia Hill, it runs through the Divide, cropping out again at Todd's Valley, crossing the Middle Fork of the American river and making its appearance again at Bottle Hill, in El Dorado county. Beyond that, I shall have to leave for others to trace, as I am not familiar enough with the country to determine; but in all that distance from Bottle Hill to Comptonville it has every appearance of being one continuous channel or ancient river bed, running a little diagonal across the present rivers nearly north and south, being higher in the mountains to the north and trending toward the valley at the south.

CHARACTER OF THE GOLD.

The gold in that distance is almost all of the same character and quality, being mostly scale gold, with the exception of some coarse pieces found on the bedrock, and it nearly all goes from 930 to 945 in fineness. Then the bowlders, sand and gravel are nearly all of the same nature and differ entirely from the hill deposits farther up in the mountains toward the summit, or lower down toward the foothills; and as evidence of this channel having had a current running from north to south, every hydraulic miner who has worked on this channel knows, if he observed it, that in piping to the north the bank will always bang over at the top before caving, whereas in piping to the south, the caves will slide off from the top first, showing the shingle to be down stream to the south, the same as it does in all running streams.

Along this whole line of channel, mining has mostly been done by hydraulic process, and millions of dollars have been extracted, and I venture to say that not one-third of it has been taken out.

THE BLUE LEAD.

Many of your readers might be interested to know why this ancient river channel is called the "blue lead." It comes about in this way: In the divides or ridges between the present rivers, the deposit of the ancient river crops out on the bedrock, below which the present streams have worn it away; then rises back to the top of the divide, making the deposit from nothing to four or five hundred feet in depth. Now, as the present streams go on wearing down the bedrock, as it has for ages and ages, it becomes exposed to the action of the atmosphere; the minerals in the rocks become oxidized and cause the rock to expand, like putting lime into a barrel—as soon as the atmosphere begins to work upon it, it swells and bursts the barrel. So with this bedrock; it swells up, and there being little or no weight of the divide upon it to hold it down, it forms a rimrock in front of all these deposits; or, in other words, a basin is formed in under the mountain, so that in many places the miners have to run long tunnels through this rimrock to drain this basin and work the rich deposits under the divide, which is invariably found to be of a *skyblue color*. This blue gravel never is known to extend higher up from the bedrock than the height of the rimrock, or to where the water has no chance to drain out, and all sand and gravel above this basin of water is invariably of a reddish-yellow color, showing conclusively that the iron in the gravel deposits above the water line has been oxidized by the atmosphere, which has given it its red color.

I have seen places where this line of distinction is so marked that a bowlder the size of a man's head would be one-half blue and the other half red. And I have seen pot holes in the bedrock, not over a foot deep, filled with blue gravel and all above it red. This occurred where there was but very little rimrock. The ravines were shallow and the gravel deposit not very deep. I have also noticed where water from the blue gravel, in running out through sluice boxes or tunnels, on coming in contact with the atmosphere, soon a coating of red iron rust will be formed on the bottom of the sluices and tunnels.

WM. A. BEGOLE.

ANOTHER APPOINTMENT AT STANFORD. William H. Hudson, assistant librarian of the Cornell University, has been appointed assistant professor of English literature in the Leland Stanford Jr. University. Mr. Hudson is an accomplished man of letters. As the private secretary of Herbert Spencer he had for some time an opportunity to see literature in the making, having been brought into somewhat intimate contact with many of the most distinguished men of letters in England.

On the Magalia Ridge.

The Magalia Ridge, Butte county, says the *Oroville Register*, has been suddenly awakened from its Rip Van Winkle sleep by a little "boomlet," as it were, which came a few months since to prepare it for the great big boom that is inevitable, and must be close at hand. It would seem that the spirit of improvements, developments and changes constantly occurring everywhere in the State but here, has at last stirred up the people at this point. The ball opened last fall when Steve Moody of Mineral Slide "struck it rich" after many months of labor and perseverance. The history of this property is not unlike hundreds of others with various ups and downs. It has paid more or less since 1882. In 1889 Moody took it in hand, running a 1000-foot tunnel. Didn't pay the owner a cent, consequently didn't pay the labor. Leins were filed and a general stampede occurred, except Mr. Moody with his usual pluck and nerve. Gathering up his forces he took heart and pick and shovel, and after various reverses was at last rewarded with handsome pay. Compromising with the creditors and owners, he remained in "the deal," and is again at the front, although threatened a few weeks since by a landslide, which stopped the works. This deposit lies on sand bedrock, adjoining the slate. They are now drifting in at new points, with large crew and handsome results. The gold is coarse and smooth, indicating plenty more where that came from.

The Eureka, located at the junction of the Little and Middle Butte, was stricken with a sort of financial la grippe, which raged in this district some three years ago. They are, however, prospecting now in quartz on this property, with fine showing. The vein matter yields from a nickel to two dollars per pan in free gold. On the strength of this, parties interested are negotiating a speedy settlement of difficulties in order to go ahead in a business-like manner.

The Bader Bros. have bonded their mine to a Mr. Hendricks of Chico. This property lies on the Little Butte about a mile south of Magalia. It has paid the owners for years past, and only recently, in sluicing out the old tunnel, several nuggets were found weighing from \$5 to \$20.

Just across from the Bader Camp on West Branch, parties are industriously running a tunnel into a quartz ledge with very flattering prospects.

Some stir, denoting that life is not wholly extinct, has occurred recently on the Berdan ridge over near the Humboldt road. A large party of surveyors, headed by that able engineer, McCoy, have been for six weeks staking out new lines at the Dix mine. South of this, on the west side of the Big Butte, lies the Best mine. At present they are working the tailings and are well rewarded.

Just above the forks of the Butte we find Peter Woods and assistants working a huge bank of tailings. If these pay but a small percentage of the past output of the mine, they are doing well. At the Queen mine, farther up the Big Butte, the owner is engaged piping at two places on the bar with good results. This mine has a fine quartz ledge also running through it only waiting for development. At Portuguese Point, opposite the Dix, Sol Petit is engaged cleaning out the old tunnels and putting sluices in order for drifting. Mr. Petit is a man of good judgment and believes fervently in luck, which he recently illustrated by stubbing his toe on a \$55 nugget while cleaning out a sluice box.

MINERALS IN BUTTE.—There is a greater abundance and variety of minerals found in Butte than most readers are aware of. Gold was found here at an early day, being preceded only by the discovery at Coloma by Marshall. The vast output from this county is estimated at hundreds of millions. Silver has been discovered in the high region known as Gravel range, and many tons of ore have been worked, demonstrating that valuable lodes of silver ore exist there. Coal has been discovered in a number of localities, notably at Table Mountain, and lately upon the land of Mrs. McCain, west of that mountain. Asbestos is very plentiful in many mining districts, and especially so about Forbestown. Soapstone, valuable for a number of purposes, has been found on several of the mountain ridges. No finer marble in the State can be shown than the deposits on the middle fork of the Feather river, and on Marble creek near Merrimac mills. A large deposit of excellent iron ore is found near Wyandotte. A large bed of superior chrome iron lies near Magalia. Granite, excellent deposits of fine clay suitable for pottery, and sandstone are abundant.—*Oroville Register*.

The Miners Should Be Aided.

The Miners' Association has appealed to San Francisco for aid. The expenses of the Association have been very heavy, and while most of the counties immediately affected have given aid, the metropolis is not less interested. If the mining now prohibited can be resumed under the system suggested by mining and by Federal engineers, then San Francisco will be greatly benefited in having that resumption made practical at the earliest possible day. It is entirely proper, therefore, for the miners to appeal to the metropolis for assistance. The success they have attained in securing official recommendation that \$450,000 be appropriated by Congress for construction of works, advised by the engineers, is very encouraging; but the bill is a long way from passage. The Miners' Convention Committee must remain in Washington until the bill is passed or refused passage, and it must continue to urge the measure upon the attention of Congressmen individually, and to use all legitimate means to command respect and an early place for the bill. The committee cannot be maintained in Washington without liberal means, and to the furnishing of them the metropolis of California ought to contribute, since that city has a great deal at stake in the matter. The revival of the mining industry means much to her, and she should labor and contribute to secure that end. The chief work to be done in the matter is to be accomplished before the bill comes up for consideration. To inform and convince Representatives and Senators, there must be laid before them in detail and persistently all the arguments used before the committee. This involves the use of much printed matter, employment of much clerical labor and the tabulation of statistics and their analysis, all of which cost money. The committee ought to have generous aid from San Francisco, therefore. The mining counties are already giving all they can, and the river counties tax themselves heavily for a work equally as important—the conservation of the navigability and drainage capacity of the rivers.—*Sacramento Record-Union*.

SMOKELESS POWDER IN RUSSIA.—It is reported that the factory which was established some ten months ago in St. Petersburg by Frenchmen, with the view of manufacturing smokeless powder according to the French method, has been declared by the Russian Government to be of no further utility, the powder having failed to give satisfaction. The factory has therefore been closed and the French workmen have been paid off. At the same time a new contract for the supply of 800,000 pounds (of 36 lbs.) of smokeless powder has been concluded with the Schlussemburg Powder Company (Schlussemburg is a small town 21 miles east of St. Petersburg) at the price of 60 roubles (£9 10s.) per pound, the total amount of the commission being accordingly 48,000,000 roubles, which sum, it may be mentioned, was not taken into consideration when the last Budget was issued. The Schlussemburg powder will be manufactured according to an earlier recipe.

OUTLOOK IN NEW MEXICO.—The *Silver City Enterprise* says: In a number of camps of lesser note throughout the county, prospecting work is being vigorously prosecuted, and several shipments have been made which proved satisfactory. Several of the camps have received a setback by reason of some of the mines being closed down through litigation, but in their own proper time they will again come to the front and be heard from. In conclusion during a residence of 13 years in Grant county, never, in our estimation, was the outlook more favorable than it is to-day for a bounteous harvest, and never did our people look forward with more joyful anticipation for the future. The year 1892 will be an eventful one for the mining interest, and mine owners are confident of the good time coming, and that not very far distant.

NEVADA SULPHUR.—The Winnemucca *Silver State* says: Alex Wise has returned from a trip to his sulphur mines west of Humboldt House. A force of men was employed at the mines all winter taking out sulphur, and the refinery will be started up in a short time. The largest body of sulphur ever found has just been struck. This find, together with that mined during the winter, will furnish enough crude sulphur to keep the refinery running for some time. Mining and refining sulphur bids fair to become a prominent and profitable industry in this country at no distant day. Mr. Wise shipped a large quantity of refined sulphur from his mines last year, and intends to conduct the business on a larger scale than ever in the future.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NEW YORK.—Amador Ledger, April 9: The large Huntington roller mill on this claim is idle, and has been for three weeks. W. G. Anderson informs us that they are waiting for the erection of pumping machinery to take the water out of the shaft below the tunnel level, where the best of the rock is met with. This shaft is 50 feet deep, with a drift run a considerable distance at the bottom. It is believed, with concentrators, that this ore would pay well. It yields fully one per cent of sulphur, and these so far have been allowed to go to waste.

AMADOR QUEEN.—I. N. DeWitt and George Thomas have been working the Amador Queen No. 2, on a lease from Dr. Bardne. They have struck a large bunch of heavy black metal, similar to that met with in the Mammoth mine at Middle Bar years ago. It is said there must be many tons of it. Whether it will pay or not remains to be seen. It is of the low-grade character, no free gold being visible. This ore cannot be worked by the ordinary milling process. It contains a heavy percentage of arsenic and other rebellious metals, and if it has to be shipped below for treatment, it must reach from \$40 to \$50 per ton to be worked to any profit.

CLINTON CONSOLIDATED.—D. Gutmann, of the Clinton Consolidated, brought down last Wednesday a box of specimens taken from the mine. There were 20 or 30 pieces of rock, all studded with free gold. They were taken partly from the 100-foot and partly from the 350 levels. Such ore would yield several hundred dollars per ton. In the upper level the rich rock is met with on the footwall; but at the 350, where the ore body is from 8 to 30 feet wide, sample quartz is distributed throughout the vein. Thirty stamps are now in steady motion, the ten additional stamps having been started this week. As the entire vein is sent to the mill, without sorting, the mine is a low-grade proposition, and its profitable working depends in a measure upon the quantity milled. An effort was made to sort the ore, but it was found impracticable, as chunks of apparently barren quartz when broken were found to contain a large percentage of precious metal. For this reason the idea of sorting was abandoned. The stamps are 1000 pounds each—the heaviest in the county—and crush an average of 100 tons per day, or 34 tons per stamp. It is in contemplation to add 30 stamps more, making 60 stamps. The vast deposit is sufficient to justify this increase. There are two distinct ledges—the Union, which carries most of the rich ore, and the Paugh ledge, which is plentifully charged with sulphurets. Altogether, the prospects of this mine are decidedly encouraging. An Ingersoll air compressor is being placed in position, and will soon be at work. There are 14 houses in Wieland—the town which has sprung into life in response to the mining activity. Eight more are to be built at once. A postoffice is assured in the near future, and the company intend to build a schoolhouse and employ a teacher at once, at their own expense if need be. All told, the company has expended fully \$300,000 on the property. It is inconceivable that such a vast outlay should be incurred unless the mill was surrendering gold in paying quantities. Mr. Gutmann says it is paying well now; that the ore averages something near \$6 per ton, most of it being caught in the batteries. At this rate, it takes second rank among the gold producers of the county, the Kennedy alone at the present time surpassing it. Charley Calvin, who has been employed by G. Gates for several months at the sulphurets saving plant below the Kennedy mill, has quit work there and is making arrangements to construct a plant for working the tailings at the Zeile. Mr. Detert, the superintendent, has given him the privilege on reasonable terms. It is said that from \$1 to \$1.50 per ton escapes in the tailings, and as the mill crushes on an average from 130 to 140 tons per day, this represents a loss of \$150 per day. If one-third of this can be saved, it will be a handsome thing for the promoter. The plant can be run with three men.

Butte.

BROWN HILL.—Oroville Mercury, April 7: There are four feet of snow, and the miners are happy as they are sure of a long season. The Wheeler & McMillan mine is taking out large quantities of pay gravel. It is now working four men, but when the season opens will put on three shifts. The Cascade mine commenced work last week. Paul Willett, owner of the Little Hope quartz mine, has tapped the ledge with a 300 foot tunnel and found rich quartz.

THE BLUE LEAD.—Hay & Clark, who are mining on the Blue lead, Potter claim, near Bangor, have very rich prospects. They have thoroughly tapped the gold-bearing lead, and found dirt that will average \$20 to the car. They are satisfied with this, and are now endeavoring to secure machinery adapted to that class of mining. The peculiar formation is hard, and must be pulverized before the dirt can be handled in a manner to extract the gold. Mr. Clark was in town yesterday, and appeared jubilant over his prospects. Other companies there have also splendid prospects.

MILL MACHINERY.—Oroville Mercury, April 7: Some time ago W. T. Coleman, the great quartz miner, bonded a ledge from Mr. Christy, near Jordan Hill. Last night, 53,000 pounds of quartz-mill machinery arrived at the depot for developing the property, and Mr. Paxton, who will superintend it, is in town to-day arranging to have the freight hauled to the mine.

Inyo.

SALINE.—Inyo Register, April 16: The prospects for the Saline Valley borax enterprises are highly flattering. Southern and partners have the necessary hoilers, tanks, etc., all ready for business. Operations will begin this week under the control and charge of H. W. Barton, a borax miner of Columbus experience. Probably 75 tons of crude material are alongside the boiler to start on, while the entire quantity available is so great that the operators do not expect it to become exhausted so long as they live and are able to work it.

Nevada.

WYOMING.—Grass Valley Tidings, April 8: The Wyoming company, operating in South Grass Valley, have a new incline down a depth of 70 feet. The old incline is under the ledge. Ore from the new shaft, where the ledge has been cut and is a foot in width, shows gold freely and carries a good percentage of gold-bearing sulphurets, also lead. The Jack Rabbit shaft is down 215 feet. A new 8-inch pump is to be put in within a week. At present it is ledge is somewhat broken, but the stringers he of comparatively high grade and the connate rock is alive with mineral.

PROMISING ORE AT THE HERMOSA.—In the south drift of the Hermosa mine, at a distance of 150 feet from the shaft, an 18-inch ledge of ore, showing good sulphurets and some free gold, has been cut. The formation is large. There is 10 inches of solid ore, the remainder broken up with stringers. The north and south drifts of the 500 level look more promising than ever before. There is a good formation on either side.

RICH QUARTZ FROM GOLD FLAT.—Grass Valley Union, April 14: Supt. Skewes brought to town yesterday from the Gold Flat mine a number of pieces of quartz of remarkable richness in gold, both leaf and solid gold embedded in crystals. The specimens, which came from the upraise above the 300 level, were rare and beautiful and attracted much attention.

GOLD FLAT MINE.—Grass Valley Telegraph, April 11: We held time Saturday evening for only a meager notice of the rich ore found in the Gold Flat mine. The rich specimens came from a large body of ore in the heck of the level and from the south part. The company is mostly composed of Grass Valley people, and besides the Gold Flat they have a bond on the Potosi mine adjoining, and will in a short time commence a drift from the 225 level of the Gold Flat to tap the large vein of the Potosi. It is supposed that the proposed drift will have to be run about 350 feet to do the business. The Gold Flat is the old Bruce Lee mine and the Potosi is owned by John Burns, who lives on Gold Flat. Years ago much valuable rock was taken from the Potosi, and all who are acquainted with the property rate it as being first-class. Paul Quick worked the Potosi a long time ago.

PEABODY MINE.—Grass Valley Union, April 12: Important improvements have been and are now being made at the hoisting and pumping works of the Peabody mine. The buildings have been enlarged until they are now of efficient dimensions for carrying on extensive operations. The main working shaft is now down 430 feet, and in the course of a week or ten days the new 12-inch pump, which has been manufactured at Taylor's foundry, will be taken to the mine and put in place. It is an excellent piece of workmanship, and capable of doing valuable service. When it is set going, the pumping in the old works will be discontinued, as it will be capable of handling easily all the water the mine is making. With this pump it is expected that the shaft can be sunk 1000 feet. The work of sinking the shaft is kept up all the time, while the east and west drifts on the 400 level are being extended. The recent strike of wonderfully rich quartz was in drifting on this level, and when stoping is commenced it is confidently expected that more of the same quality will be found. On Saturday more of the same kind of quartz was taken out, the pieces of quartz being studded thickly with coarse gold, and when broken showed all through. When the pump is in place so that underground work can be prosecuted without interruption, a much larger amount of ore can be extracted. At the present time only five stamps of the mill are kept going, but they will pound out \$10,000 for the present month's run from the showing already made by the clean-ups. There is every possibility of the Peabody making one of the great mines of the district, and that it will be a fortune to its owners. This will be accomplished through the indomitable energy of Alf Tregidgo, the general manager, who has had the fullest faith in the mine from his first connection with it.

THE OLD STEEP HOLLOW DISTRICT.—Nevada Transcript, April 7: There will be considerable prospecting on the north fork of Steep Hollow this year, and systematic efforts will be made to strike the famous blue lead. The Democrat Hill placer mine, owned by Michael Skaehan and Richard Neville, is undoubtedly a good mining claim. It contains 1653 acres of land, and is situated in Remington Hill mining district, adjoining the once famous Remington Hill mine, from which James Green, in 1864, took nuggets valued at \$7000, \$3000 and \$2000, respectively. A tunnel low enough, and about 250 feet in length, would now place the mine upon a paying basis. The channel is about 3000 feet wide. The surface ground is well timbered, and the mine owners have a good water right. A great deal of gold has been taken from this mine. J. M. Blain has a high channel containing large, smoothly washed boulders of quartz, mixed with the gravel. His tunnel will strike good gravel soon. A. B. Everetts of Guernsey county, Ohio, is negotiating for the purchase of the claim adjoining the Pioneer. The owners of this mine are Messrs. Greely, Vance, Beightol and Mackin.

PROMISING STRIKE.—M. D. Cooley has made

a valuable strike in his mine near Washington. A ledge of fine-looking quartz, running from four to five feet in thickness, has been struck, the ore showing free gold and carrying a large percentage of rich sulphurets and galena. Mr. Cooley feels highly elated over his prospects, and talks of erecting a mill to be run by electricity. Development work will be pushed as rapidly as possible.

Plumas.

GENESEE.—Cor. Plumas National, April 9: Mr. Gruss is working a large crew of men, and by the continuous patter of the stamps and his pleasant smile, one is led to believe, with favorable results. This mine is located in two hills, called the North and the South, and the most of the work done by Mr. Gruss has been in the latter. It was here he sunk a shaft last winter, and at present, with the other work being done, he is running a tunnel from the lower level of the South Hill to cut a vein known to be in the North Hill. I am informed that he has between two and three hundred feet more to run. In this tunnel he lately cut a vein of beautiful peacock copper ore, rich in gold, but unfortunately it is so low that much of it can be worked without sinking the shaft to a greater depth. Mr. Ant na Joseph has been taking life easy this past winter, and is waiting for the water to get low enough for him to resume work and pick up the big bright nuggets as in former seasons. Charles Moren is also and for many years has been running a tunnel in Grizzly to tap the gravel deposit. I hear that Mr. Brandt is negotiating for the sale of his mine. Mr. Brandt has certainly one of the very best ten-stamp mills in the county, and, I am told, has some rich rock. Mr. Graham of the Green ledge, who has been in ill-health for the past winter, is still quite poorly. Mr. Sipes, his partner, is driving ahead. They took out some very rich ore last fall. Mr. Tutt, better known as Barney, is driving his tunnel to cut a back ledge that crops out on the surface. Next, but not least, is Mr. Thurner's claim. In the late fall and the early winter Mr. Thurner ran about 180 tons of ore through Mr. Tutt's arrastre. John Bordan, who is chief engineer of the hoisting works at the Gruss mine, and son, are running a tunnel to cut the main contact, on the surface of which they get some very flattering prospects. Mr. J. S. McDonald, who has lately had Mr. Williams employed, is steadily pushing his tunnel ahead. Out of a shaft a little ahead of face of drift, an Indian, from whom Mc thought, took out some very rich rock.

Placer.

PAYINO.—Placer Republican, April 6: In reference to Placer county mines, we learn that the Morning Star mine in its last dividend paid \$4 per share. The Holman drift mine at Wisconsin Hill is paying well. Gravel in the Breece & Wheeler mine has been going as high as \$4.02 to the car.

San Bernardino.

GOLD AND SILVER.—Redlands Citigraph, April 9: A considerable interest has been occasioned the past week by the discovery of a ledge of gold and silver-bearing ore on the foothills east of Montone. There is a well defined ledge of white quartz in a slate formation. The results attained by 30 or 40 assays are somewhat peculiar. One assay will yield nothing, while others will give as high as \$35 to \$43 per ton, the ore coming from the same portion of the ledge and having the same appearance. The location is about five miles from the center of Redlands and about one mile from Montone.

TIN.—One of the most important discoveries of the season is that of rich tin mines in the eastern part of this county. The mines are 35 miles south of the Old Woman's mountains. The veins are large and carry a high per cent of tin. Some valuable silver mines have also been located in that portion of the country.

NEW TIN MINES.—San Bernardino Times-Index, April 9: Mr. Judson, who has just come in from a trip to the Colorado river country, was met by our reporter this morning, and the following interview speaks well for that part of the county lying northeast of the San Bernardino range of mountains: "Well, Mr. Judson, we learn that you have just returned from the recent rich mineral finds out on the desert. Will you give us some information of what there is in that country?" "Yes, sir, I will. In the first place let me say that these new finds are not on the desert. They are all located in well-defined mountain ranges, which are at present reached by crossing a desert country of 40 miles from Danby station in an easterly direction. I think the best way for prospectors to go in would be by way of the Needles; then go down the river, as the Needle, with its great advantages over all other places on the line of the A. P. R. R., will be the outfitting point for all of the Colorado river country. The recent discoveries of silver mines by some prospectors from Ehrenburg, Arizona, and what I believe will develop into one of the best silver camps in the State, is situated less than 18 miles from the Colorado river, and about 40 miles in a southwesterly direction from the Needles. These gentlemen made eight or ten locations in the new camp. The ore is very rich and resembles the rich silver ore that was taken out of the mines in the Ivanpah camp in its most palmy days. The tin ore discoveries were made about 35 miles nearly south from the Old Woman's mountains. The veins are very large, being from 20 to 60 feet wide, the entire length of five locations. The entire ore body in all the claims carries a very high per cent of tin. While I have a substantial interest in the tin locations, neither myself nor Mr. Edwards made the discoveries. The discovery was made by a well-known prospector one week before we went into the country. The statement as published that we located this property was not correct. We went out to examine what is known as the Scanlin group of mines situated 25 miles southeast of Danby station, which is

silver and gold, and sure to be one of the many new bullion-producing camps in that country in the near future." "Mr. Judson, can you give us any information regarding the rich strike which was recently made in the Iber mine near the Needles?" "Yes, sir. There has been no strike made lately in the Iber mine. The strike has been from the surface down in the shaft and not a pick has been struck from the top to the bottom of the shaft but what brought up ore that will mill from \$300 to \$600 to the ton. The now famous Iber gold mine discovery was made, I think, about five years ago by a well-known prospector, Wm. McCoy. Where the discovery was made the croppings showed a large amount of free gold, and also in many different places along the line of the vein. A shaft was sunk by these former owners to a depth of 60 feet. This work was all done quite a distance from the ore body or vein in soft ground, but when the hard-shelled Baptist people of Riverside got hold of the mine, who are as eager for gold as they are for county division, they started in on the gold rock from surface and have made a most wonderful winning. This property has been regarded generally of but little value. Last summer I was induced by Mr. McCoy to go out and examine the mine. I was so favorably impressed with my first visit to the property that I made two other trips to the mine alone."

Shasta.

GLADSTONE.—Redding Free Press, April 9: Capt. Clark of the Gladstone mine was in this city Wednesday, accompanied by two members of the company who had just been on a visit to the mill and mine on Klein gulch. Capt. Clark informed us that his partners were more than pleased at the outlook for the mine. Last month, with 20 stamps, 1700 tons of ore were put through the mill. Two fine bodies of ore have been recently discovered. Mr. Clerk states that ore averaging \$12 to the ton is good enough, as he is able to save all but a small per cent of the gold. The Gladstone employs about 100 men and is probably the best equipped mine in Shasta county.

NOTES.—The Little Nellie mine has just received new screens, plates, bolts, etc., in fact, two and a half tons of new lining for their Dodge pulverizer. J. M. Gleaves, the superintendent, expects to make a good clean-up in several days. F. G. Gould of the Phoenix Iron Works, San Francisco, has been visiting our mines and introducing the Denver concentrators. Supt. Barron of the Snyder mine, on Squaw creek, has ordered one.

NEVADA.

Washoe District.

CONC. CALIFORNIA AND VIRGINIA.—Virginia Chronicle, April 9: 1500 level—The drift running south from the shaft station has been extended 35 feet; total length, 190 feet. At this point we are extracting some ore and fillings in the vicinity of the old stopes. 1650 level—Have continued to extract ore of fair quality from the drift run west from the top of the upraise carried up 69 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from the winze No. 3 (down 73 feet) in working upward from that point. From the north and of the California ground on the west side are working in the old stopes and extracting therefrom some ore of fair quality. 1750 level—In working out and upward from the bottom of winze No. 2, sunk from the 1650 level, we continue to extract ore of fair quality, also some milling ore from the stopes on the eighth floor. In the east crosscut No. 3 from the main south drift some ore has been extracted. From the drift run north from the same east crosscut, at a point 20 feet north from that crosscut, the winze has been sunk five feet; total depth, 22 feet. From this point an east crosscut has been advanced 20 feet in quartz formation, showing some ore of milling value. There has been extracted from all parts of the mine during the week 1187 470-2000 tons of ore, which was shipped to the Enreka mill. The average assay value of the ore worked at the Enreka mill during the week, 870 tons, was \$17.50. Bullion shipped to the Carson Mint, assay value about \$24,389.65.

OPHIR.—1465 level—From the end of the crosscut run east from the drift run north from the drift run west from the winze 122 feet below the sill floor of the 1300 level, a east crosscut No. 2, has been extended 25 feet; total length, 63 feet; continuing in porphyry and quartz of low assay value. From the mouth of the north drift have commenced working easterly and extracted some milling ore therefrom. Have been making some repairs to the 1550 station.

MEXICAN.—On the 1465 level the south drift from the crosscut running east from the bottom of the winze 32 feet east from the winze, has been advanced 20 feet; total, 54 feet, continuing in porphyry with quartz of low assay value.

UNION CON.—The Union Con. east crosscut, started from the south lateral drift at a point 1570 feet west from the shaft, has been advanced 20 feet. The face is in clay and porphyry.

HALE & NORCROSS.—On the 900 level the north winze was sunk during the week 15 feet; total depth, 25 feet; bottom is in quartz, but of no value. East crosscut above 900 level on the north line was advanced 30 feet; total length, 45 feet. Formation, quartz and porphyry. 1100 level—Extracting ore from above and below this level. 1500 level—Have stopped work in bottom of No. 1 winze below this level and started to stop out ore south from the bottom of the winze. Have men on repairs and doing prospecting work. Yesterday we began shipping ore to the Occidental mill, where 100 tons will be tested. During the week have hoisted 535 mining cars of ore from the 1100 and 1500 levels, and shipped to the Brunswick mill 441 420-2000 tons. Average battery assay of ore worked at the Brunswick mill for the week,

\$17.05. Shipped to U. S. Mint, Carson, during the week bullion of the assay value of \$4,418.55.

OCCIDENTAL.—The winze from west crosscut in the south drift, 350 level, has been connected with the crosscut in the south drift on the 400 level. North drift, 450 level, is in 45 feet, and continues in fair ore. West crosscut from north drift, 550 level, is in 22 feet; face shows seams of pay ore. Have started a crosscut on the 750 level at a point 350 feet north of winze station; face in low grade quartz.

SIERRA NEVADA.—The joint Sierra Nevada and Union west drift, 900 level, was extended during the week 25 feet, making its total distance west of shaft 1825 feet; face in porphyry. The north drift from the Kenosha tunnel was advanced 40 feet; total distance, 863 feet; face in porphyry.

UTAH.—The west drift from the shaft station, 340 level, has been extended 54 feet; total length, 451 feet. This drift has been passing through a very hard porphyry formation, but the face it presents is softer and more favorable looking.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 645 feet; face in gypsum.

CON. NEW YORK.—The west drift from top of raise, 75 feet above 600 level, is out 14 feet in quartz, showing bunches of good ore.

CHOLLAR.—Are making repairs on the 450, 650 and 750 levels. The east crosscut on 1610 level, 150 feet south of north line, is out 40 feet; face in hard porphyry.

BULLION.—The east crosscut, 350 feet south of north line, 1300 level, is out 27 feet; face in quartz and porphyry that give low assays. The joint Potosi and Bullion west crosscut, 1500 level, is out 103 feet; face in hard porphyry. The east crosscut, 120 feet south of north line, 1500 level, is out 286 feet; face in hard porphyry.

BEST & BELCHER.—900 level.—All work in east crosscut No. 1 for the past week has been on repairs. West crosscut No. 1 has been advanced 15 feet through hard porphyry and stringers of quartz; total length, 155 feet.

POTOSI.—Are repairing north drift from Sharon shaft on the 250 level. The south raise above the 1100 level is up 105 feet on the slope; top in porphyry and streaks of quartz. The winze is now down 182 feet below the 1500 level; bottom in low grade quartz. The joint Potosi and Bullion west crosscut, 1500 level, is out 103 feet; face in hard porphyry. Extracted and sent to mill during the week 350 tons of ore; milled during the week, 200 tons; on hand at mill, 151 tons; average battery assay, \$24.38.

Highland District.

PROSPECTS.—Pioche Record, April 7: Several very encouraging prospects are being opened on the west side of the range just beyond the Mendah mine. Pete Honeyman and Jack Baxter came in from that place a few days ago considerably excited over the discovery of a rich vein of chloride in the Carbonate claim, which was taken up only last January. As soon as the snow will permit, work will be resumed and the boys are assured of all the assistance required to properly open up the claim. The prevailing opinion of that section is that good-paying mines will be opened up there, though it is somewhat difficult of access.

Tuscarora District.

DEL MONTE.—Times-Review, April 9: Will start No. 1 north drift as soon as it can be re-timbered, the country being soft and swelling ground.

NEVADA QUEEN.—Second level.—No. 1 south drift has been extended 31 feet, and No. 3 east crosscut 26 feet, cutting through a seam of high-grade ore. This is in the footwall, the vein being above. Have started drift from top of No. 2 and 3 raises, so that stopes can be started as soon as the connection is made between east crosscut and No. 1 south drift. The ore in the top of both raises assays from \$248 to \$1074 per ton. Third level.—No. 3 raise, 120 feet east of No. 1, at 10 feet cut, 12 inches of good ore; chute has been placed and started to open up on the ore. Stopes at No. 1 and 2 chutes continue about the same; produced 8 tons first-class, average assay \$316 per ton, and 123 cars of second-class, average assay \$36 per ton. Sent to sampling works 19.76 tons of ore, average assay, \$296.21 per ton.

NAVAJO.—No. 2 winze, 300-foot level, extended 7 feet. The vein is not looking as well as at last report. No change elsewhere.

BELLE ISLE.—West crosscut No. 2, 350-foot level, has been extended 20 feet. North drift from No. 1 east extended nine feet, with fair assays.

NORTH BELLE ISLE.—West crosscut, 400-foot level, extended 9 feet. South intermediate drift above the 500-foot level extended 12 feet, showing good ore. Crosscut from the intermediate 15 feet. No. 4 north drift, south 500, extended 8 feet; west crosscut, same level, extended nine feet.

Pine Nut District.

ACTIVE.—Silver State, April 9: There is considerable activity in Pine Nut district, near Carson. Some of the mine owners are building, while others are putting in their time jumping claims. The case involving an interest in the Zirn mine, the most important location in the district is now being tried in the District Court at G. noa.

NEW MEXICO.

MIMBRES.—Southwest Sentinel, April 9: Thos. B. Pheby of the Mimbres Consolidated M. and M. Co. has received orders to stop work in the mines of the company. The mill will run long enough to clean up the ore now out, but nothing further will be done until the price of silver gets up around the dollar mark. There

is nothing in mining silver even in the rich mines of this company at present prices. The contract for hauling the machinery and timbers of the Telegraph mill, which was purchased some time since by John Brockman of this city, has been let to Fred Harrison. The mill is to be hauled to Bremen's ranch, near Lone Mountain, and the work is to be completed by the 15th of May. Additional machinery for the mill has been ordered from the East, and the mill will be put up and got ready for operation as soon as possible. Work has been commenced on the new mill near the Maud S. mine, in the Silver Creek district, and it will be pushed to completion as rapidly as men and money can do the work. It is the intention of the owners of the property to have the mill running some time in July. It will have a capacity of about 35 tons of ore daily. During the first three months of this year the ore was more rich in mining strikes made in this county, and more sales commenced in this part of the Territory, than in any similar period in the history of the county. This is going to be a good year for millwrights in this section. Work has been commenced on the new mill at the Confidence Co. as soon as the title to the property can be perfected; the St. Helena C. will build a mill at Central this summer, and John Brockman will put up the Telegraph mill at Lone Mountain. Other mills are being talked about, and probably some will be built before the close of the year. The Colchis mill here, which has been under way for so long a time, is now in a fair way for completion. These mills will, when completed, add more than 500 tons to the daily milling capacity of this section. Nathaniel Bell of the firm of Bell & Stephens, of Pinos Altos, paid this office a visit last Saturday and exhibit d two gold bricks which had been turned out at the Bell & Stephens mill. One weighed 91 ounces and was valued at \$17.50 per ounce. The brick, besides seven tons of concentrates which will run \$65 per ton, was the result of a recent run of ore from the Golden Rule (now the Santa Rosalia mine). The other brick was out of a run of 64 tons of ore from the Pacific Extension mine at Pinos Altos, and was worth about \$15 per ounce. The concentrates from this ore will run about \$85 per ton. The ore from which this brick was made came from 100 feet deeper in the mine than any ore from the mine ever worked before. As soon as the title to the Confidence group, in the Silver Creek district, can be perfected, the company will build a large mill. It has not yet been fully decided whether the mill will be built at the mine and the power transmitted by electricity from the creek, where a large water wheel will be put in, or whether the mill will be built on the creek and the ore be transported by rail to the mill. Both projects are under consideration, and an electric plant would undoubtedly be put in if there had been a water supply at the mine sufficient for use in the mill.

OREGON.

A RICH STRIKE.—Eugene Register, April 9: A gentleman who came in from the Myrtle Creek mines this week reports a rich strike there. They have struck an old channel that is extremely rich in the yellow metal. He says he saw \$30 taken out of three pans, and one pan yielded \$10, one piece being valued at \$9. This is looked upon by the men as the richest strike in that region, but there is acre after acre of good paying dirt. Washing is going on right along, and it is likely that the next cleanup will be a good one.

UTAH.

DEEP CREEK.—Salt Lake Journal, April 7: A very rich discovery of silver ore is reported on the east flank of the Deep Creek mountains, about 12 miles from Kearney's ranch. The first-class ore assays from 7360 to 20,000 ounces in silver, and a sample lot of 100 pounds taken from almost barren-looking croppings from 10 to 20 feet above the surface of the ground and across the ledge 80 feet in width was assayed, giving 2120.69 ounces to the ton. This rich mineral deposit promises to be the only rival, so far discovered, of the famous Treasure Hill, White Pine county, Nevada. The formation in which this discovery was made is hard, blue lime, identical with that of the Treasure Hill. The mineral is strictly a silver ore, and carries neither gold, lead nor any other metal, with the exception of a little copper. The big ore discovery is less than two weeks ago, together with the further discovery in Fish Springs within the past month, seem to fully justify the prediction that this will be a great year for the mining industry of Utah.

WASHINGTON.

A STRIKE.—Centerville Leader, April 7: M. G. Barney and M. A. Rush have made a strike which promises to eclipse anything that Okanogan county has ever produced. Last Thursday, in company with an expert, they were looking over a claim which they own on Mt. Chepaca, with the view of putting some men at work to open it up. The gentleman who was with them detected that at short distance from the ledge they had been working on (which is the second extension of the famous Hunter ledge) and running parallel with it, was an immense ledge of quartz fully 100 feet wide. They broke a few pieces at random from the ledge, and, after locating three claims adjoining this one, came down to Loomis and had a piece of the ore assayed. It went \$16.53 in gold and 30 cents in silver. This was much better than they expected, and to satisfy themselves of its real value they will at once make a thorough test of the ledge. It is estimated that if the ore is free-milling and will average \$4 per ton, it is the richest thing yet discovered in the county.

Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

Dr.	Cr.
ARIZONA MINES.	Hale & Norcross, \$4,630
Crocker	Justice, \$7,717
Peck	Kentuck, \$3,326
Peck	Lacy Washington, \$450
Silver King	313 Mex. can., \$7,621
Weldon	83 Oec dental, 303
BODIE MINES.	Ophir, 13,078
Bodie	Overman, 3,122
Bulwer	27,962 Potol., 10,713
Mingo	2,709 Savage, 25,515
Standard	38,114 Seg. Bul. hor., 2,086
Summit	636
Syncline	1,337 Sierra Nevada, 19,048
COMSTOCK MINES.	Ward Hill, 1,733
Alpha	6,918 Union, 13,999
Alta	35,214 Utah, 1,031
Andes	—
Belditch	31,502
Benton	606.9 Copins, 1,186
Best & Belcher	2,061 Commonwealth, 26,378
Bullion	18,623
Caladonia	8,411 Grand Pico, 6,488
Challenge	122
Chollar	6,489
Confidence	13,452
Con. Cal. & Va.	15,239 North Belle Isle, 27,217
Con. Imperial	1,132 N. Commonwealth, 3,439
Con. New York	277
Crowa Point	3,339
Exchequer	17,278 Enreka, 2
East Sierra Nev.	43 Holmes, 42,084
Gould & Curry	10,815 Mt. Diablo, 3,478

*Collecting assessment.

NOTE.—Ophir has unsold bullion valued at \$7500. Navajo has \$1,300 due on pumping account. Overman has \$800 due on assessments. Con. Cal. & Virginia has \$16,651.31 in bullion, with other shipments to arrive. Hale & Norcross has unsold bullion valued at \$12,255.86.

Mining Share Market.

SAN FRANCISCO, April 14, 1892.

Mining shares the past week sold down under systematic cross-orders by the stock pools and mill rings. The writer still believes in an up-move and now that quotations have been made so low it ought not to surprise anyone to witness higher prices than have been expected by those who claim to be able to get the very best of information. While a firm believer in high prices yet the writer cautions dealers to be prepared for set-backs and also big breaks, for no market can be successfully made without them. The mill rings have crushed the life out of the market through a system of procrastination, expensive dead work—much of which is unnecessary—and many leaks, to eat up money, by which excuses could be had to levy assessments. For five long years this has been done and with the best results as far as insiders are concerned. With the shares of several mines known to have good ore opened on several levels, selling at prices about as low as they usually get, it does seem as if persons who hold shares will stand a good show of making considerable money, more than by any other means before the end of the year. Now, after hard work in freezing out outside shareholders, the managers of these mines have the water under control so that more active work can be done in pumping the mines out, and as good air connection has been made on the 1700 foot level prospecting work can and doubtless will be done in several of the mines, which ought to be followed with the best of results.

Between now and the month of August several mining companies will hold their annual elections. The first will be that of Con. Imperial, which will be followed by that of Crown Point, then by that of Overman and two or three others.

The Standard Con. Mining Company and the Bulwer Mining Company, both in the Bodie district, have declared a 10 cent dividend. These two companies have reversed the usual order of things, for they declare dividends with the shares selling quite low; heretofore dividends were only declared when the shares were selling at high prices. The trading public does not know what to think of the new move.

Mining shares opened this morning fairly steady under a light business. To show how trading has fallen off and how little interest is manifested in the business, we will state that at about 11 o'clock this morning there were only 12 persons present in the S. F. Stock & Exchange board room. The "tickers" in the various places of resort are also more or less deserted.

On Tuesday, April 12th, the directors of the Hale & Norcross Mining Company held a meeting, at which the president of the company was instructed to request the superintendent of the mine to conform to the laws under which the company incorporated. In the letter to the superintendent, the president, Mr. Messer, gave sections of what is known as the Felton amendment (this is given in another department of to-day's paper) approved April 23, 1890. Mr. Messer also gave at some length the Supreme Court's decision in the case of Manuel Eyre vs. A. K. P. Harmon, et al., reversing the decision of a lower court on the above section of the law. The Supreme Court ruled that the Felton amendment was not conforming to in every particular. The letter closes as follows: "It is the intention of the board of directors of this corporation (Hale & Norcross Mining Company) to comply with all the provisions of the law of this State in regard to mining corporations and the object of the board in writing this letter is to give you, as its superintendent, notice of the above decision, as a guide by which your administration of the company's affairs shall be conducted, and request and direct that all the requirements of the law be complied with. We desire to manage and direct the affairs of this corporation with a proper regard for the rights of those for whom we are responsible, and object of the statute is to secure to stockholders their right, to have general information of the manner in which the business of the company is being conducted, and to give them that information in the manner indicated by the statute." The above, which is good reading for assessed-rack shareholders, will do no little good in allaying all opposition and causing the organizations as the Mining Stock Association and Brokers' Combine to stand in with those mine managers, who seek an honest reformation in mining and the milling of ore. The revelation in the suit against the directors of the Hale & Norcross Mining Company opened the eyes of mine managers, who live elsewhere than at Virginia City, to the manner in which they are being victimized, and to this, no doubt, is largely due their earnest desire of fighting the manv wrongs.

News from the Comstock district is generally of a very encouraging character. Important work is outlined in one of two groups of mines, which will have a favorable bearing on the mining share market, provided the mine managers follow the example of the directors of Hale & Norcross. On the 1800-foot Ward shaft level, the work to be done will be largely directed toward developing at that depth of Potosi, Sullion, Alpha and Exchequer mines. Air connections have been made on the 1700-foot level between Crown Point and Belcher. This is quite important. The official letter received this week from the superintendent of the latter mine reports that in the north drift on the 1300-foot level running toward Crown Point the face in quartz is assaying from \$1 to \$11 a ton. This is liable to improve as the drift is worked ahead. On the 300-foot level in the same mine they are raising and also sinking on a rich streak of ore. Potosi is milling ore. The

low-grade ore left left by the former management is being milled by the new management of Hale & Norcross. When this is cleaned up the ore mills will assay higher. In Con. Virginia, on the 1800-foot level, they have rich ore from 12 to 16 feet wide. Official letters from Overman continue to give favorable news. Interesting news is looked for from the Alta group of mines.

Continued favorable news comes to hand from the Bodie district. The old Bodie mill is to have some kind of improvement made by which its crushing capacity will be increased. Active prospecting work is under way in the Quijotoa and Tuscarora districts.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING APRIL 5, 1892.

472,492.—NEWSPAPER VENDING MACHINE—Alexander Berg, Seattle, Wash.

472,101.—CIGARETTE MACHINE—H. Bohls, S. F.

472,031.—SAW-FILING MACHINE—E. Christensen, Portland, Or.

472,432.—FRICTION COUPLING—H. P. Christie, S. F.

472,112.—HILLSIDE PLOW—D. B. English, Guerneville, Cal.

472,170.—MUSIC-LEAF TURNER—E. G. Gillespie, Artesia, Cal.

472,497.—STAMP-CANCELING MACHINE—W. Groth, Seattle, Wash.

472,351.—BABY JUMPER—J. Higham, Oakland, Cal.

472,169.—TOLL-COLLECTING APPARATUS FOR TELEPHONES—Kato & Rhodes, Los Angeles, Cal.

472,300.—EXHIBITION CAR—M. Leak, S. F.

472,374.—MAGAZINE TACK HAMMER—A. T. Lewis, East Portland, Or.

472,378.—GOVERNOR FOR STEAM ENGINES—R. G. Manifold, S. F.

472,304.—PRUNING IMPLEMENT—C. L. Mann, Colma, Cal.

472,507.—COIN-ACTUATED VENDING MACHINE—Robert Morau, Seattle, Wash.

472,278.—LABEL HOLDER—H. J. Small, Sacramento, Cal.

472,489.—NUT LOCK—W. P. Sweetland, S. F.

472,150.—JOURNAL BEARING—Todd & Anderson, Shelton, Wash.

472,151.—CENTER PLATE FOR LOGGING CARS—Todd & Anderson, Shelton, Wash.

472,152.—CHOCK BLOCK FOR LOGGING CARS—Todd & Anderson, Shelton, Wash.

21,449.—DESIGN FOR BUTTON—A. A. Brunswick, S. F.

The following brief list by telegraph, for April 5 will appear more complete on receipt of mail advices:

California—Arthur F. L. Bell, San Francisco, valve; J. N. and L. N. Burke, Forest Hill, elastic trace connection; George S. Burnett and S. T. Sweeney, San Francisco, curvycomb; Quintus V. P. Day, Dinuba, harness hook; Lorenzo Dwight and A. A. Jephuni, San Francisco, waste-water gate for washing machine; William H. Kidd, Santa Rosa, sawhandle; John M. Lockwood, San Francisco, electric lighting system; Elbridge G. Miles, San Francisco, shoe ward North, Newhall, check-book; Anna C. Peck, San Francisco, carving brace; Alfred C. Rulofsen, San Francisco, curvycomb; Augusta Tache, San Francisco, chalk-line holder; G. H. White, San Francisco, administrator of George W. White, deceased; John M. Lockwood, San Francisco, street sewers; George Winkler, San Francisco, animal trap; Fred W. Wood, J. F. Fowler, Los Angeles, brake for street cars; Washington—Eric Silen, Kelso, combined churn and butter-maker; John T. Lake, Seattle, device for producing blasts of air for ventilation.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic orders). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

STUMP PULLER.—Wm. B. Morris, Seattle, Wash. No. 471,873. Dated March 29, 1892. This is an improvement on a similar device patented by the same inventor, August 4, 1891, and consists of a novel arrangement of gripping clamps operated by oppositely moving eccentrics upon a power shaft which causes them to reciprocate alternately. These clamps act upon a draw bar, moving in suitable guides and having the pulling rope attached to one end. This rope acts through any suitable blocks upon the stump to be pulled. The opposite end of the machine is anchored firmly to hold it stationary and all the power to be applied to pull the stump.

CONNECTING RO JOINT AND BEARING.—Milton A. Clennam, S. F., assignor of one-half to Weldon C. Rarig, No. 471,953. Dated March 29, 1892. This invention consists of two sleeves interposed between the pin or shaft and the inclosing box in which the pin or shaft turns. These sleeves are made of phosphor bronze or other suitable material for wearing surfaces, the inner one being keyed to the shaft or pin and the outer one to the interior of the box, so that the wearing friction takes place between the two sleeves. These sleeves are easily replaced when worn, and the other parts are never subjected to wear.

EXHIBITION CAR.—Mondula Leak, S. F., assignor to the Leak Advertising Co. No. 472,300. Dated April 5, 1892. This invention is designed to provide a car which is to travel about the country from place to place upon the railway, said car being provided with devices for the exhibition of goods and a convenient arrangement of eating, sleeping and office fixtures which are convertible to one form or another for night or day use as may be desired. The car, as constructed, is especially available for exhibition, office and residence purposes.

MECHANICAL PROGRESS.

Smoke Prevention at Chicago.

Last week circular letters were sent to the president and superintendent of motive power of every railroad entering Chicago, says the *Coal Trade Journal*, stating that tests of smoke consumption had been made and three devices found that can be applied to locomotives and which will suppress the nuisance satisfactorily. The various roads will be allowed sixty days in which to equip their engines with any of the three or any other device which will accomplish the same result. After the expiration of that time offenders will be prosecuted without further warning. In view of the opposition expected from railroad officials, the society's engineer, Mr. White, was careful to have his tests thorough in every respect. It would appear that some owners of these devices have met with scant courtesy at the hands of railroad officials. The experiments on the tug boats are to be made this week. All of this is a matter which concerns the coal trade very closely, and operators and shippers are watching the results and outcome very sharply. A device brought out very recently is designed for use in private residences, where the smoke in each individual case is not great, but in the aggregate it is large, and as this is the age for improvement, owners of dwelling houses should know that they, too, can aid in abating the smoke nuisance. The device we refer to employs the down draft system of combustion and is built for air-heating. The owners of this patent claim that combustion in the furnace is complete in all respects; that consequently it emits no foul smell; that it is a great fuel saver and gives out greater heat than the ordinary furnace, because it gets all the units of heat out of the fuel that there are in it. Consulting Engineer White of the Society for the Prevention of Smoke, in a recent lecture at a meeting of stationary engineers, said: "There are comparatively few inefficient boiler structures, but the number of inefficient furnace structures is many. The cause of excessive smoke was undoubtedly due to overcrowding the combustion chamber, *i. e.*, overtasking its capacity and the furnaces could not burn the fuel supplied to them. Nothing unreasonable will be asked from offenders; they will not be prosecuted for the use of soft coal, nor for the production of smoke, which is conceded to be unavoidable at certain times and under certain conditions. But that persistent offenders will be 'brought to time' is a foregone conclusion." It will cost time and effort to accomplish the desired result, but it must and will be done.

New Form of Coal-Washing Machinery.

A French trade publication gives an account of a new form of coal washer. This is a modification of the piston-jigger, having an arrangement for scraping the surface and removing the top of the washer layer under treatment. It consists of a sieve-plate 10 feet long and 3½ feet in width, the apertures being largest next the feed end—fixed on a pyramidal hutch, having a plunger box attached to one of the long slides, and an opening variable by adjustable slides for the discharge of the heavier waste on the other. The piston is a circular wooden dish moved by an eccentric and communicating motion of the water in the hutch through a cushion of air confined above the water in the piston box. The scraper is a harrow-like frame suspended by a system of jointed rods above the sieve-plate, and receives motion from a cam acting upon the counterpoised arm of an angle lever, which gives a slow forward and quick return motion. The frame is connected with a slide, opening the feed-hopper, so as to allow a fresh portion of material to be dropped upon the plate at the coarse end, at the commencement of each stroke, where it is subjected to the most energetic action of the water, while the finer portions of previous charges brought to the surface are drawn forward by the teeth projecting from the frame toward the discharging end. Usually the frame is so suspended as to pass clear of the charge on the return stroke. The length of the stroke of the frame is 20 inches, so that the surface of the washed material is broken up six times in its passage over the ten feet length of plate.

The machines weigh about six tons each, and are worked in pairs, each pair requiring a motive power of four to six h. p., and one man to attend to them, and the average product is 15 tons per hour for the two machines.

NEW ENGLISH ENGINE REGULATIONS.—Some valuable practical regulations have recently been published by the English

builders of a high-speed engine said to run satisfactorily at 700 revolutions per minute and to develop 200 horse-power. According to this, if the boiler pressure always exceeds 70 pounds, it is worth while to use a compound engine, and, if as high as 150 pounds, a triple-expansion engine. If the engine exhausts into a vacuum the corresponding pressure will be about one-fourth lower—the extent to which the steam may be expanded with advantage depending on the boiler pressure; if the expansion is carried to more than a certain number of volumes it is advantageous to divide it into two stages—that is to expand partly in a high pressure or small cylinder or cylinders and partly in a low pressure or large cylinder; with still greater expansion, it is worth while to expand in three stages, that is, in three successive cylinders of increasing diameter, and so on. It is admitted, however, that, although there are great practical and economic advantages in the system of expansion in successive stages, there is no essential difference in principle between expanding, say, eight times, in a series of three cylinders, with comparatively late cut off in the first or smallest one, and expanding eight times in the largest of the three only, with the steam admitted to it direct and cut off at one-eighth stroke.—Scientific Machinist.

Uses of Wood Pulp.

Wood pulp is now extensively used as a composition for moldings and decorative work in private and public buildings. In the manipulation of this composition, beautiful effects can be obtained by mixing in it the various aniline colors—strong or tinted—or those known as metallic colors. Bronze powders, of various colors, may also be used with pleasing results. By the use of this material all the better qualities of fine-grained wood are obtained without any of the drawbacks of shrinking or expanding on account of atmospheric conditions.

The extent to which the wood pulp business has been developed in this country is not generally known. The inroads on our forests, which its growing consumption for railway ties, building and the requirements of the press involve, are numerous. So serious has this matter become, it is stated, that unless each State passes a law for the encouragement of tree planting, there will some day be a tree famine.

As giving an inkling of the magnitude of the general consumption of wood pulp, a correspondent states that for a single edition of a prominent daily in New York 17 tons of blank paper were required. This was the product of 67 cords of poplar. In 22 hours from the time of felling the trees it had been turned into printed papers. The process is thus divided with respect to a test case: Chopping one half cords of wood, three hours; manufacturing into pulp, 12 hours; transporting to printing office, one hour and twenty minutes; wetting paper preparatory to printing, 30 minutes; printing 10,000 copies, ten minutes. This shows the rapidity with which raw material can be turned into a finished article. When it is considered that the foregoing figures refer to only one paper in one city, and that almost every newspaper is printed from material consisting largely, and often almost wholly, of wood pulp, which is also used in the production of nearly all common and medium grade of paper for almost all uses, the magnitude of the consumption of wood in pulp-making becomes apparent.

French Technical School.

Francis B. Loomis, commercial agent of the United States at St. Etienne, France, gives an interesting account of the model, well-organized and successful technical school at St. Etienne. At this school, several trades are practically and theoretically taught, and the teaching is entirely gratuitous, the Government deeming itself well repaid by the production of intelligent and educated artisans. Perhaps the most important trade taught at Etienne is that of cabinet-making. The apprenticeship is four years in duration. At the end of four years a certificate of aptitude is given, which enables the lad to obtain a situation in the line of industrial labor which he has chosen. The work at the school commences each day at 7 o'clock in the morning and is finished at 7 o'clock in the evening, with an interval of one and a half hours for dinner.

The lectures are of two kinds. The first are common to all students of the same year, and embrace general subjects, while the second are exclusively technical and are special to each section. In the first year the students pass through all the workshops to be initiated in the proper handling of the different tools, whether of iron or wood. After this period, the boys are classed ac-

cording to their tastes, desires and aptitudes. They work at manual labor three hours daily during the second year, four hours in the third and five in the fourth and last year for the first half, and seven in the last six months, in order to become accustomed to the burden of a day's work. During this period, also, special attention is paid to the teaching of the theory of the different trades. Very careful attention is paid to design. The apprentices at all the trades are obliged to follow the instructions given on this subject, which is rightly considered of the greatest importance in the school. Designs of various kinds are executed with great taste by the more advanced sections, and every year an exhibition of the work of the boys is held. The results of this school have been most excellent, and I am informed that, as a rule, its graduates become self-sustaining members of society in a very few months.

SCIENTIFIC PROGRESS.

The Solarometer.

Wm. H. Beehler, Executive officer of the U. S. man-of-war Pensacola, now at Mare Island Navy Yard, has recently invented a peculiar scientific instrument called a solarometer, and has patented it through the MINING AND SCIENTIFIC PRESS Patent Agency.

The solarometer is about three feet in diameter and will rise above the deck of a vessel about six feet. A constant level base sustains a system of concentric sphere rings and fittings that allows the apparatus to remain level at all times. The entire apparatus resembles very much a ship's binnacle and will be similarly fixed in position. On the top is a stellar globe, having an exact representation of the fixed stars and constellations visible in the skies clearly marked on its surface, together with the meridian lines, equator and the ecliptic for one year, surrounded by a horizon ring mounted on a flat stand and provided with apertures. It is by means of these astronomical arcs that latitude and longitude are determined.

In all observations taken at sea with a sextant the horizon plays a prominent part. The sun is often plainly visible, yet correct latitude and longitude cannot be taken, because the horizon line is not visible. The solarometer works independently of the horizon. What has made the use of this instrument possible as well as practicable, is a book of azimuth tables, the first of which was issued in 1884 by the Government.

The solarometer is constructed upon scientific principles of nautical astronomy, and it facilitates the observations of celestial bodies. It does away with the use of logarithms and elaborate calculations to solve problems in navigation. With this new instrument observations can be made at any time day or night when any celestial bodies are visible.

Local apparent time or observers longitude, observers latitude and the compass error can be indicated by it at the instant it is used on any celestial body. It can also be used for rating chronometers, especially when the latitude and longitude are accurately known. The facility with which it can be used and the accuracy of its indications constitute a reliable indicator of a vessel's speed at sea for any length of time between observations.

A nautical almanac, a chronometer and a book of azimuth tables are used in conjunction with the solarometer to determine locations at sea. The chronometer must be regulated for Greenwich mean time, which must be converted into Greenwich apparent time by applying the equation of time as given in the nautical almanac. The book of azimuth tables is a volume giving the true bearing of celestial bodies for every ten minutes of local apparent time, for every degree of latitude from the equator to 70 degrees north and south and for every degree of declination from zero to 90 degrees north and south. The approximate local apparent time is used as ascertained by applying approximate longitude to the Greenwich apparent time. The approximate latitude is used with the declination from the nautical almanac. With these quantities the approximate true bearing of the celestial body to be observed is found in the book of azimuth tables to be published for use with the solarometer.

Lieutenant Beehler has been working on this invention for a number of years. On July 30, 1891, he secured home and foreign patents. The reason given for keeping the invention a secret so long is that a publication of the details would have made it impossible to secure many of the foreign patents. A manufactory for the produc-

tion of solarometers will be established at Baltimore, Md., within a very short time.

"I was a passenger on the Pacific Mail steamer Costa Rica when she was lost on this coast in September, 1873," said Lieutenant Beehler, "and I firmly believe that a solarometer would have obviated that disaster. There are numerous other losses of a similar nature that I could mention. Another case in which this invention will be appreciated is where ocean steamers make from 300 to 500 miles a day, and with a sextant the exact time can only be taken once in 24 hours. This is too long a time to elapse, where so many miles are covered, without a full determination of location."

The Improvements in Aluminium.

But a very short time ago, comparatively speaking, both aluminium and magnesium were regarded as purely chemical wonders. Owing, however, to the vast improvement which has been effected in the manufacture of these metals, and the energy with which such manufacture has been pursued, they are utilized to-day for nearly every kind of manufacturing purpose. In many parts of the world there are established important aluminium and magnesium factories, but perhaps one of the most extensive and successful is that known as the Hemelingen Fabrik, situated near Bremen, in Germany. At this establishment, aluminium and magnesium are made for every purpose to which they can be adapted, and a representative of *Machinery*, who lately finding himself at Bremen, writes to say that he went all over the works belonging to this important firm, being shown every part of the important manufacture from its very beginning.

Not only have aluminium and magnesium a distinct technical value in their pure state, but they are extremely useful for blending with other metals. Magnesium has always been in special favor for lighting and optical purposes in signaling, fireworks and photography, but now that its value is raised as a blending agent, its sale and demand are likely to be considerably increased. One of its principal recommendations is that it cleanses the metal with which it is blended from all impure parts, which effect cannot be procured without its assistance, and especially when casting is resorted to. For this purpose, then, magnesium is now added to copper, and owing to the eminently satisfactory results attained, the Hemelingen Fabrik has been further induced to try the experiment of adding magnesium to a quantity of German silver, brass and nickel, with the result that the experiment has proved surprisingly satisfactory. The proprietors have discovered also that a slight addition of magnesium to German silver prevents the evil of zinc and nickel oxide from remaining. The same effect, we understand, is obtained by the addition of magnesium to nickel, while at the same time the addition considerably promotes the value of the metal. It is also known that nickel treated in this manner is much easier to handle while the hammering, turning and drawing processes are being carried out. Most of the leading German nickel manufacturing firms are already purchasing large quantities of magnesium from the Hemelingen Fabrik, the result of the experiment being known to have been thoroughly satisfactory. From what the correspondent says, the Aluminium and Magnesium Fabrik can fairly claim to have rendered a great technical and industrial service by reason of its discovery, a fact which has been duly recognized by the highest German State authorities.

Dust in the Atmosphere.

Prof. Aitkins, an English Scientist, shows the air to be full of minute particles of dust. Outside air at Colmonell in Ayrshire contained from 8000 to 155,000 particles. Near Falkirk the smoky atmosphere showed from 180,000 to 2,296,000 particles per cubic inch. Glasgow air showed from 2,750,000 to 7,500,000 per cubic inch, and Edinburgh air from 750,000 to 4,000,000. In the meeting-room of the Royal Society, when showing the Fellows his experiments, 4,500,000 were counted just before the meeting, 6,500,000 near the close of the meeting, 49,000,000 near the ceiling just before the meeting, and 57,500,000 near the ceiling at the end of the meeting. In his own laboratory he calculated 30,000,000 of dust particles in the cubic inch of air; near the ceiling, 88,000,000; and above a Bunsen flame the infinite number of 489,000,000. A cigarette smoker sends 4,000,000 of particles into the air with every puff he makes. Mr. Aitkins' observations, during the summer of 1889, were made on the Continent to find out the minimum number of particles in natural air untouched by artificial causes. At Hyeres, near Toulon, the number per cubic inch varied from

48,000 to 384,000; the latter when the wind was blowing from the town. At Cannes the lowest observation was 24,000, when the wind was blowing from the town. The sea air at Hyeres contained 28,000; at Mentone, 80,000, with a steady wind from the sea, and at Cannes double that number. At Lucerne, in Switzerland, the specimens of air tested were remarkably free from dust; on the Rhigi mountains the minimum was 3360 particles. In the purest Highland air in Scotland, tested by Mr. Aitkins, he found the minimum to be 32,000 particles per cubic inch.

ELECTRICITY.

A Big Proposition.

Monday night, at the meeting of the Board of City Trustees, during the wrangle and discussion over the proposed franchise for the new "Electric Light and Power Co.," an important piece of news leaked out. It is no less than a well-developed scheme to harness the big volume of water in the Sacramento river that flows to waste by this town, and converting it into power for running all kinds of machinery. The Redding Water Co., and Electric Light Co.—the two concerns practically under the same management—are behind the scheme. They propose to take the water out of the river at the lower end of Turtle Bay, and convey it through an open cut or ditch across the old Oliver land to a point on the river near the free bridge. The water right has been located and recorded and the survey for the ditch has been made. The survey revealed the fact that at the point on the river where the company expects to erect the power plant they will get 14 feet fall at low water and 7 feet fall at high water. They claim they can develop anywhere from 800 to 1000 horse power with the 7-foot fall. This, too, during the flood or high water stage of the river. Already, so we are informed, the company has put up a capital of \$20,000 to commence development work on, and have also purchased a large amount of 12-inch main pipe for the water company, which will be laid to connect the reservoir on the hill with the new power plant, and in a few days the contract will be let for excavating the ditch. The company will run the water works and the electric light plant with this power, and will also furnish electric power to anybody who may want it. In connection with this enterprise, another company propose to connect with the ditch and carry it on down to Cottonwood for the purpose of irrigating the bottom lands between Redding and Cottonwood. This is entirely practicable, and the scheme will add immense wealth and prosperity to the county if carried out.—Redding (Shasta Co.) Democrat.

Military Telephony.

During last year's autumn manoeuvres in Eastern France, an extensive use was made of the telephone at the direct instigation of the Minister of War. Batteries not being available, magnetic telephones had to be used exclusively, the receiver being fastened to the headgear, while the transmitter was held in the hand. A combined receiver and transmitter was also tried, of 50 mm. diameter and 400 gr. weight. A bare bi-metallic wire of six mm. diameter, with earth return, was used. A good earth was obtained by fixing a bayonet in the ground. Mounted soldiers connected the earth line with the bridle of their horses and the current went to earth through the hoofs of the horses. Two men formed a telephone attachment. One carried the telephones and a movable drum weighing 2½ kg., on which 1000 m. of wire was wound; the other carried a light bamboo cane with a hook at one end, and also a drum with wire. The two men could thus lay a line of 2 km. The man with the telephones walked at a quick pace, whereby the wire on his drum was unwound, and his comrade followed and laid the wire over branches of trees, hedges, walls and in ditches to preserve it from injury as much as possible. In one of the trials, a line of 23 km. length, with an intermediary station, was laid in five hours; the transmission was perfect, and the whole line was taken up again in one hour. Earth shunts seem to have but little influence. During a sham fight on the 7th of September, a line of 12 km. length worked without interruption, although a whole division of cavalry passed over the line. The cost of 10 km. wire, ten drums, three telephones and five bamboo canes amounted to £7 8s.—Electricity.

AN INDUSTRIAL REVOLUTION.—The City Council of St. Etienne has decided to

apply electric motive power to all the hand-loom in the city, and contracts have been made with an electric company for the necessary plant and currents. The electric dynamos are to be driven by water from the city reservoirs. There is practically an unlimited supply of water in the reservoirs, with a fall of upward of 100 feet. The cost of producing the electricity will be reduced to the lowest point possible. To grasp the importance and far-reaching results of this innovation, says *Electricity*, it is necessary to understand that the bulk of the enormous output of ribbons (£4,500,000 a year) is the product of house industry. The weavers for the most part own their own looms and operate them by hand in their own houses. There are 18,000 looms which are thus distributed among the homes of the weavers, while the number of looms driven by steam in the few ribbon factories of the town is only 5000. The 18,000 looms of the independent weavers are valued in the aggregate at £900,000. What the city of St. Etienne proposes to do is to convert each one of the 18,000 hand-loom into a power loom driven by electricity. Electric light will also be furnished. The result of this change from slow, laborious, uncertain hand-power to the swift, regular, unfailing power furnished by electric motors will be an increase in the productive capacities of the looms and a considerable reduction in the general expenses of fabrication. According to the report of the American Consul, the weavers of St. Etienne have always been the most artistic ribbon-makers in the world, but they have enjoyed few mechanical advantages. Now the old order of things is to be changed, and the products of the St. Etienne ribbon looms, which have been a trifle more costly than similar products in some other countries, notably in Switzerland, will be turned out at the lowest possible prices. The work people employed in the ribbon trade number 70,000.

The Vacuum in Lamp Bulbs.

One of the most interesting stages in the progress of the manufacture of incandescent lamps, says T. R. Taltavall in the *Electrical Age*, is the exhaustion of air from the bulbs, and the life of the lamp depends more upon the success of this part of the work than anything else.

Human beings cannot live without air, but electric lamp filaments cannot live with air, the oxygen in the air which is so essential to the support of animal life is fatal to the life of an incandescent lamp filament. The carbon of the filament oxidizes very readily when heated in the air, and for this reason it is necessary to confine it within a bulb from which the air has been exhausted.

The exhaustion of air from lamp bulbs is accomplished by means of vacuum pumps, and it must be conducted with great care, as it is at this stage of lamp-making where the greatest difficulties are met. Mercurial pumps are used for the exhaustion of air, among the best known of which are the Sprengel and Geissler. Mechanical pumps are usually employed to hasten the process in its first stages, mercurial pumps being afterward used to complete the work. The mechanical pump cannot produce as high a vacuum as is necessary for lamps, while the mercurial pump can produce a higher one than needed.

A word about the mercurial pumps will be of interest.

The Geissler mercurial pump is a modification of the apparatus used by Torricelli in his experiments which led to the invention of the barometer, the space between the top of the column of mercury in the barometer tube and the top of the tube itself being called a Torricellian vacuum. The Sprengel pump is somewhat simpler than the one just referred to, and is thought by many of those who have used both to be capable of producing a more refined vacuum.

To give a general description of the action of these pumps in practical operation, it may be said that the bulbs to be exhausted of air are connected with that portion of the tube containing the mercury where the vacuum exists, and then in creating the vacuum, the air contained in the bulb is carried off with that in the tube. When the proper degree of exhaustion has been attained, the bulb is melted off at the neck by a glass blower and the lamp is then ready to be finished.

The process of exhausting the air from lamp bulbs is similar to driving a swarm of flies out of a room. It is a comparatively easy matter to get a large number of them out, but when few remain the hard work begins. So it is with the air in the bulbs. It is easy enough to get most of it out; the hard labor comes when we get to the last of it.

After the air has been sufficiently exhausted from a bulb, there remains less than one-millionth part of the original quantity.

USEFUL INFORMATION.

A NOVEL FOUNDATION.—A novel foundation was used in building a lighthouse at Gull shoal, on Pamlico sound, North Carolina, says *Engineering News*. The building was to be founded on screw piles and preliminary borings indicated firm material. When work began setting the piles, however, it was found that, although at first penetration was difficult, after ten feet depth was reached, there was little resistance to the turning of the screw. The soft layer appeared to extend deeper than the piles were intended to penetrate, and it was not thought prudent to test the lighthouse on the piles without some additional means of support. It was therefore decided to surround each pile with a cast iron sleeve, 1¼ inches thick and 11 feet long, provided with a disk of the same material, 5 feet in diameter, intended to bear on the hard upper stratum of the shoal. This scheme had been tested, and proved economical and effective at another station in the same lighthouse district. The piles were screwed to a depth of 13 feet, and the sleeves were dropped over them after bolting the disks on to the lower end. The sleeves were secured to the piles by set screws. The lighthouse is a hexagonal wooden building, and is supported on seven piles.

BORING HOLES.—For boring long, deep holes that do not go clear through the pieces so as to permit of using a boring bar, use a tool having right back of it a set screw which may be run out so as to touch the opposite side of the bore from the one the tool is working on; and have half way between these two, so as to touch the circumference of the bore hole 90 degrees from the tool and 90 degrees from the first screw, a similar screw which may be adjusted so that the tool will be kept centrally, and the hole kept straight. If the job be such as to permit the hole being bored vertically, there will be no trouble about getting out the borings or having them crowd under either of the set screws; but if it must be a horizontal job, the tool must be rigged so that one of the screws shall be at the top and the other at one side, the tool being on the other side.—*Engineering Magazine*.

DYNAMOS IN PARALLEL.—To stop a dynamo running in parallel with one or more others or with a storage battery on the same circuit (usually constant potential) regulate down its E. M. F. until it is only slightly greater than that of the circuit (about one per cent) and its ampere meter shows that it is producing very little current. The switch connecting it to the circuit should then be quickly opened. Under no circumstances, however, should a dynamo in parallel with others or a battery be stopped, slowed down or have its field magnetism discharged or weakened (*i. e.*, more than enough to regulate its E. M. F., as stated) until its armature is completely disconnected from the circuit, as it might be burnt out or driven as a motor if its E. M. F. fell more than a few per cent.—*Electrical Engineer*.

OIL is apparently to be used instead of coal under the furnaces at the World's Columbian Exposition. The lowest bid for coal was \$2.44 per ton, while the Standard Oil Co. offered a 42-gallon barrel of oil for 70 cents. As this company claims that three barrels of oil are equivalent to one ton of coal in heat-giving qualities, the oil is cheaper than the cheapest coal, and the management favors the oil provided it can get it for 70 cents per barrel until 1893, and thereafter at the lowest market price, not exceeding 72½ cents per barrel. The lowest estimate made of coal required is 75,000 tons, and on this basis at least 225,000 barrels of oil would be wanted—probably the largest quantity ever sold to one consumer.—*Engineering News*.

WARNING CARS.—The Midland Railway Co. of England are trying the experiment of warning their cars by means of hot water from the boiler of the locomotive, the arrangement being in operation upon the express trains. The contrivance is a simple one, and so far seems to have met with success. The pipes pass through each of the compartments in the train; the driver has control of the apparatus, and so regulates the process as to produce the required heat, and the pipes, when not in use, are emptied, thus preventing their freezing in severe weather.

It has lately been found that the brilliant light emitted by an electric welding machine when at work is very injurious to the eyes of those using it. In one case where the welding of iron vessels by the Bernardos process

was being done, the best protection that blue glasses could afford proved insufficient, as the sight of the operators suffered considerably after a few months' work. It may be suggested that yellow non-actinic glasses would be better.—*Industries*.

AN improved form of wood screw is one which has on the under side of the head a series of teeth or serrations for the purpose of forming a countersink to enable the head to sink into the wood and lie flush with the surface.

GOOD HEALTH.

Massage Treatment.

The word massage signifies motion and pressure applied to parts of the living body for curative purposes. Massage is the application of motion and pressure to the soft tissues of the body by the hand of the operator, and should be given under the guidance of the educated and experienced physician. Massage is not good for every disease which afflicts the human family, and a knowledge of anatomy and physiology is essential to the proper application of massage, which is based on plain physiological laws, and has nothing in common with magnetism; nor is it a form of exercise or gymnastics, or a system of rubbings. There should be no surface friction or skin rubbings in the proper massage treatment. In a general way, without going into details, it may be described as a system of kneading, compression, rolling, wringing, percussion, and vibrating the soft tissues of the body. The Swedish movements are a system of slow motions, with and without resistance, made by the director or physician. They are often combined with the massage treatment. The rationale of this method of treatment is that the circulation is invigorated, oxygen is carried to the tissues more rapidly, the blood is purified more effectually, and the carbon and debris of the body are liberated more freely. This is done without any expenditure of will power or nerve force. Old adhesions are broken up, and inactive muscles are brought into action. The forces of the organism are mostly expended through the circulatory and muscular systems, and less vital energy is exhibited in the nervous. The expenditure of vital power is accelerated. It is a law of vitality—of all living things—that the development of vital power and strength is accomplished only by augmenting the expenditure of this same power. The athlete knows by continuous effort and exertion that by great expenditure of vital power he can gain the strength and power to perform his herculean task. So the horse trainer is aware of this law, and takes advantage of it in developing his horses. This is the philosophy of the massage and Swedish movement treatment. It is not only adapted to the sick and diseased, but is a method of treatment highly beneficial to the business man or woman whose incessant application in the office has enfeebled his or her vital energies, and made them feel the need of recuperating their physical powers.

"Seeing Snakes."

There is an optical illusion, usually the result of debilitated health, consequent on over-indulgence in alcoholic liquors, that frequently takes the form of "seeing snakes." An authority thus explains this phenomenon to the *Optician*: The eyeball is covered by a network of veins, ordinarily so small that that they do not intrude themselves visibly in the path of the light that enters the sight, but in the course of some disease these veins are frequently congested and swollen to such a size as to become visible, and when this happens the effect generally is to appear as if there were an object of considerable size at a distance from the eye. Of course, this vein is generally long, thin, and sinuous, like a serpent, and the figure seen is frequently startling like a snake. That they seem to live is due to the fact that they are often not in perfect line with the direct front of sight. They are either to the side, up or down from the focus, therefore, when discovered, the victim naturally turns his eyes toward the effect, and the effect, of course, moves away. The eye follows, and thus a continuous and realistic motion is obtained. Now, if the eye be quickly turned to the front again, it will see another snake, which, if watched, will glide away in the same manner. One individual who was afflicted with malarial disease, and had his eyes thus congested, had strange shapes and clouds pass before his vision, which, if he were in a state of nervous collapse, might easily have taken the form of the shapes seen by those suffering from delirium tremens.



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BUSINESS ANNOUNCEMENTS.

(NEW THIS ISSUE.)

Irrigating Machinery—San Francisco Tool Co.
Assay Office—Thomas Price & Son.
Assessment Notice—Occidental Con. Mining Co.

See Advertising Columns.

MINERS AT NEVADA CITY.—A mass meeting was held at Nevada City on Saturday evening last, being in the form of a reception to the president, secretary and nine members of the Executive Committee of the California Miners' Association. The meeting was called to order by A. Tregidgo, president of the Nevada County Miners' Association, who introduced Hon. J. H. Neff, of Colfax, president of the State Miners' Association, as chairman of the meeting. After Mr. Neff's address, speeches were made by Hon. John F. Davis of Calaveras, who was followed by W. C. Ralston, Wm. Irelan Jr, Senator E. M. Preston, Hon. M. H. Mead, S. K. Thornton, Major J. S. McBride and Judge Dibble. Resolutions were adopted thanking the delegates at Washington. The San Francisco delegation was given a banquet, and altogether the meeting was a great success.

ROBERT S. McMURRAY, one of the California Miners' delegates to Washington, returned to San Francisco this week, accompanied by Major Frank McLaughlin, who spent some days in Washington with the delegation. Both gentlemen are hopeful of favorable action by Congress on the debris bill.

SEVERAL new buildings will shortly be commenced at Palo Alto, mainly dormitories for accommodation of students. There are now about 500 students at the university.

Mining Interests in Congress.

The near approach of the time when delegates will have to be chosen to the State Conventions of the respective political parties should this year awaken the interest of practical mining men, who are accustomed to pay little attention to politics. The same men who will now assemble in the spring and summer to choose delegates to the National Conventions at Minneapolis and Chicago, will reassemble later in the year to nominate Representatives to Congress. We have a cause to be championed in the House, which is of more immediate importance to the miner than any mere question of politics or fiscal policy, and it should be seen to that men who are able and sound should be nominated by both parties.

The important mining sections of this State, with the exception of San Bernardino, lie almost wholly within the First and Second Congressional Districts, and it is to these districts primarily that we must look for advocates sincerely devoted to the mining cause. In the First District, unfortunately, things have so far shaped themselves that there is little hope for us to expect much comfort.

If we are to have a man upon whom we can rely to handle this subject in a broad and conservative yet energetic manner, we shall have to look to a representative from the mountain counties of the Second District. In that district the road is still clear to the nomination of men, who, instead of being lukewarm, would be active and energetic in all efforts for the rehabilitation of hydraulic mining on a just and equitable basis. No recent convert, who fought the miners or ignored them when they needed friends, and came in at the eleventh hour, should be sent to Washington this time. On the other hand, it may be urged that a man from either of the two mountain counties most directly affected might be an object of suspicion to the farmers. It would be a mistake to nominate a man who is open to either of these objections.

The Democratic party will probably give the nomination to A. Caminetti, of Amador, as the political courtesy of a renomination is generally given unless there is good cause against it. Mr. Caminetti has seconded the efforts of the Miners' Committee in Washington in a manner that is acceptable and is in accord with his record while a State Senator. But for the death of Geo. G. Blanchard of El Dorado, there is no doubt he would have been the Republican nominee, and he would have been a giant in the cause. As it is, the only Republican name thus far mentioned in connection with this nomination, against which there is no objection, is that of John F. Davis of Calaveras. Mr. Davis is by profession a lawyer, is a mine owner, is from a conservative community, and is a public speaker of a high order of ability. He is a new man, with a clean record, and etumped the district with Judge Blanchard in the campaign of two years ago. Since Mr. Davis' return from Washington, he has been a most efficient member of the Executive Committee of the Miners' Association.

Let us see to it that men upon whom we can rely are nominated upon both tickets, and then the interest of the miner will be promoted, whichever party wins.

MR. SKIFF, chief of the Department of Mining of the World's Fair, says that it is already assured that in the mines and mining building will be gathered in 1893 incomparably the largest array and most instructive evidence of the mineral wealth and progress of the mining industry ever collected or attempted.

J. S. MACARTHUR, one of the inventors of the MacArthur-Forrest process, is at Johannesburg, South Africa. Several people have written to us for his address, supposing him to be out on this coast.

The MacArthur-Forrest Process.

Not since the first experiments with the Russell lixiviation process, some years ago, has there been as much interest manifested in a new metallurgical process as that at present being shown in the MacArthur-Forrest system, sometimes called the "cyanide process." It is of particular interest to California miners, because it is especially adapted for working gold ores. As compared with chlorination, this cyanide process involves no roasting, and therefore no fuel; and may be utilized in regions where furnaces would be impracticable. It will also work ores which cannot be touched with profit by chlorination; and much less "chemicels" are necessary than in the latter process. This cyanide process also takes out both the gold and silver.

In the MINING AND SCIENTIFIC PRESS of March 26th was a full description of the process written by one of the inventors. In our number of last week was another article by a practical millman well known on this coast—Mr. A. B. Paul. This gentleman has made a number of experiments at Middle Creek, Shasta county, and has been twice to Denver to see the works there.

Mr. Paul gave in brief, in his letter last week, an account of what can be accomplished by this process. It was a surprise to many to be told that the heaviest sulphureted ores could be treated without roasting, and yet 95 per cent of the assay value be realized. This is a very important thing for this State, where we have so much sulphureted ore. Mr. Paul says it costs from \$2 to \$5 per ton to work ore by this process; and it is not necessary to first concentrate the sulphurets and then work them separately from the original ore. Mr. Paul says, "you can extract the gold and a high per cent of silver from any ore."

The big 100 ton mill at the Needles, San Bernardino county, will soon be in operation using this process, and we shall look forward to the results with great interest. One of the best metallurgists and millmen in the State has gone up to see the works under Mr. Paul's management at Middle Creek, and we shall be glad to hear his opinion of what has been accomplished there. Meantime, mine owners everywhere are anxious to gain all the information they can on this subject. In view of the renewed interest in this process, we shall republish next week the experiments of C. W. Merrill made at the metallurgical laboratory of the University last summer.

Why Congress was Asked.

The Truckee *Republican* does not believe that Congress will grant any appropriation for debris dams; and does not think it was worth while to go to Congress at all for relief. It wants to see the debris carried in a flume or pipe to the tule lands and there deposited. It suggests the formation of a company to do this, collect the gold and improve the lauds; and thinks the miners should carry out this or some other project themselves and not bother with Congress.

The miners did go to Congress for relief, not because they wanted to, but because they had to. The debris was injuring the navigable rivers, and these rivers belong to the Government. The decisions of Government courts were against even muddying the waters of the rivers. Where dams had been built to impound the debris, the mines discharging into these dams had been enjoined. Therefore it was useless to build dams without a special act of Congress authorizing them. For these reasons the miners went before Congress. If the Government itself builds debris dams it is not likely that the mines using them will be etopped; whereas, if the miners build them without Government authority, then work may be stopped.

A good many plans have been brought forward to put the debris on the tule lands. The trouble is that there is not fall enough

from the head of the valley, or foot of the mountains, down to where the debris is wanted. When the waters slow down their speed, where there is little fall, the debris being carried, no longer remains in suspension. It settles down and causes trouble. There is too much of it to be carried in a pipe or an ordinary flume, anyhow, and grade enough could not be given in the valley to carry it any great distance.

The Californians want to do this work themselves, if allowed to. If the Government will build a few typical debris dams in the main rivers, the miners will build auxiliary ones in the canyons near their respective mines. But nothing at all can be done at present, or until Congress sets the seal of approval on the report of its engineers.

The Tulloch Concentrator.

JAMES TULLOCH, of Angels' Camp, Calaveras Co., inventor of the ore-feeder and concentrator which bears his name, has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, an improvement on his concentrator, which, as is well known, is of the endless belt variety. The improvements consist in suspending the endless traveling belt or apron from above by suitable swinging connections, and in imparting to the belt a reciprocating movement, whereby its surface describes a concave arc; also in a novel means of suspending the table; and in a novel mechanism for effecting what is known as the "uphill travel" of the belt.

The prime object of the improvements is to so arrange the endless belt or table that every point in its surface may describe a concave arc in swinging to and fro, in contradistinction to the convex arc which said belts have heretofore described, by reason of being mounted on movable standards below. This motion is considered by the inventor to be advantageous in better spreading the material over the surface of the belt, and in keeping it worked away from the sides thereof and toward the center, resulting in a more perfect concentration.

The shaking-frame of the machine, carrying the drums and supporting rollers, is mounted at an inclination, so that the belt is likewise so inclined and has an uphill travel.

Mr. Tulloch suggests several ways by which the belt or table may be suspended from above, but that which he prefers consists of inclined arms secured at each side of the frame near each end, said arms extending upwardly to and under the middle of the top bars to which they are freely hung by means of a link-bolt or jointed rod in the centers of the top bars, so that the belt or table is suspended centrally from above. By rotating the crank-shaft the belt or table is vibrated about its point of support above, and every point in its surface describes a concave arc, resulting in spreading the material upon the surface of the belt more generally and equally and in keeping it from packing upon the sides, directing it toward the center.

To effect the uphill travel of the belt, connected with the base frame by a loose joint is an actuating pawl directed by a suitable guide and having its upper end adapted to engage the teeth of a ratchet. As the table swings toward the pawl, the ratchet is brought into contact at each return stroke with the pawl, and as the ratchet swings through its upward movement it is turned one tooth at a time by its engagement with the pawl. This engagement of pawl and ratchet and the direct connection of the latter with the shaft of the head-drum makes a simpler device than those shown in the previously patented machines of the same inventor.

ADOLPH SUTRO delivered a lecture to the mining students at the State University last week, descriptive of the driving of the Sutro tunnel.

Machinery for Sizing Coal.

The adjustable bars, finger-bars and oscillating bars used in sizing coal at the iron breaker at Drifton are something like the Grizzly used on this coast, but are improvements upon it. The finger-bars E have been recently introduced. In using the old-fashioned continuous bars, part of the dirt and fine coal is often carried over the bar, and is delivered in the chute at the lower end instead of falling through; and as the spaces between the bars are parallel and closed at the lower end, long pieces often wedge and catch, particularly at the bottom, thus necessitating a frequent cleaning. Of the finger-bars, the lower end is entirely free, and the bars are narrower there than

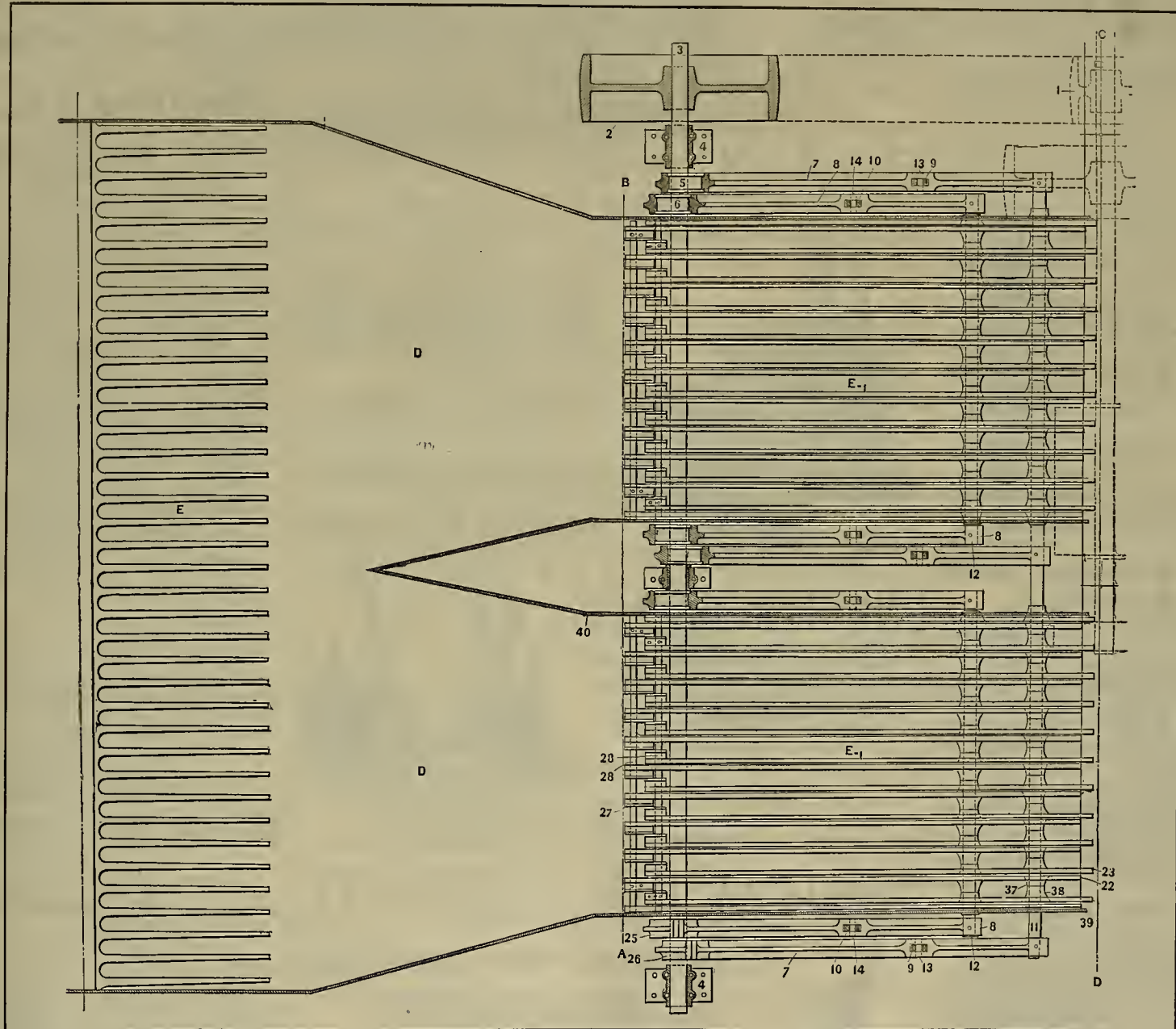
the engraving have been introduced within a few years at the Cross Creek collieries for several reasons. They diminish the height of the breaker, because they are shorter and much flatter than the fixed bar of the same cleaning capacity. They act as a regulator or feeder for the breaker, the amount of coal passing over them per minute being constant if the supply is sufficient and the number of revolutions remains the same; while, by regulating the speed of the driving shaft, the quantity can be varied at will within certain limits. They allow the men upon the platform to get much nearer their work without danger. (With the ordinary fixed bars, the pitch must be sufficient to allow the coal to slide down freely. This it often does, with great velocity, so that

arc of a circle three inches long, while the center of the eccentric strap describes a circle three inches in diameter.

The center of the shafts (11 and 12) describes approximately an ellipse; that is, the center of 11 and 12 rises and falls three-quarters of an inch in moving forward three inches, and falls and rises three quarters of an inch in moving backward; but 12 is always above 11 when it moves forward, and below when it moves backward, and vice versa. The bars are flat on top, the extreme lower end (23) being rounded off to allow coal to roll off easily, then for a certain distance to the left they are horizontal, then they rise in a curve, the center of which is upward, to the point where the coal arrives upon the bars.

upward a little, advances beyond its adjoining half, which is moving backward, and thus pushes the coal forward. All the working parts, except the portion of the bars used for screening and the supporting shafts (11 and 12) are either covered, as is 28, or are on the outside of the iron sides (39) of the coal-chute. The bars are immediately over the mud-screen pocket, into which all the coal falls freely. Shafts (11 and 12) must be far enough apart to allow the large lumps passing through the bars to fall below them.

The essential difference between this construction and that of the Briart bar is, that in the latter the supporting shafts are driven directly by eccentrics, which involves the necessity of having the shafts which carry



PLAN OF DUMP, FINGER AND OSCILLATING BARS USED IN SIZING COAL.

at the upper end; and any lump that may wedge is likely to be loosened by the first lump which strikes it. Upon the vertical portion at the upper end are two half-holes, by which they are bolted to the beam or bar-bearings. In order to permit the varying of the opening as may be necessary, the bars are cast simply tapering from the top down, or with a greater or less projection near the top, like the old form. The holes are cast or drilled in the bearer for the greatest opening with the ordinary bar; if it is desirable to reduce the opening, the bar with the projection on the head is used. By changing the angle between the top of the bar and the back, a greater or less angle of inclination can be given to the bar, without changing the position of the bar-bearer.

The movable or oscillating bars shown in

the men must remain on the side. When the oscillating bars are used, the coal can be fed upon their upper end, from which it is gently carried to the platform. This allows the men to stand safely in front of the bars instead of on the sides. They bring the coal cleaner and with less small stuff to the platform, thus permitting a better separation of coal, slate, etc.

This machine, a modification of the Briart movable bars, consists essentially of a series of double bars placed sufficiently far apart to allow coal of the required size to pass between the bars of each pair. On the main or driving shaft (3) are two eccentrics (25 and 26) placed 180 degrees apart. At each end each bar moves two eccentric rods (7 and 8), which are suspended to the suspension bars 9 and 10. When the driving shaft revolves the points describe an

The upper ends of the bars which are carried by the rollers, are under the coal chute D. All the half-bars carried by 12 will be above those carried by 11 when moving forward, and below when moving back, while at the beginning and end of each forward motion they will be on a level.

The result is, that a lump large enough to straddle two half-bars of the same system will be raised by one set of half-bars, moved forward three inches and deposited on the other set at the end of the stroke, and will then be raised, moved forward and deposited on the first. In this way the coal will be moved forward six inches for each revolution, until it tumbles off at the end. It must be observed, however, that although the upper part does not rise when the half-bar moves forward, the other part is carried

the bars rise and fall the same distance as they move forward, while in this construction they only move up and down half as much as they move forward. It was found that, with the Briart construction, the coal was thrown up and down too much when it was fed forward with any rapidity.

In the engraving of these oscillating bars, 2 is the driving pulley; 3, driving shaft; 4, pedestals for driving shaft; 5, eccentric sheave for long eccentric rod; 6, eccentric shield for short eccentric rod; 7, long eccentric rod; 8, short eccentric rod; 9 and 10, suspension links; 11 and 12, carrying shaft for rod; 13 and 14, upper suspension pins on links; 16 and 17, lower suspension pins on links; 22 and 23, long-nosed and short-nosed bars; 25 and 26, eccentric straps; 27, planed roller surface on end of bar; 28, steel rollers.

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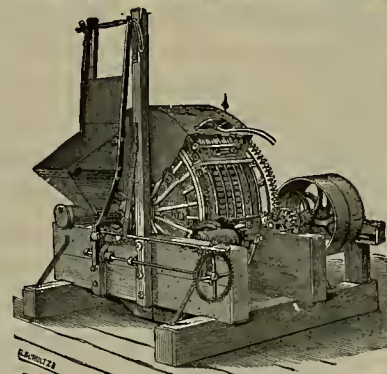
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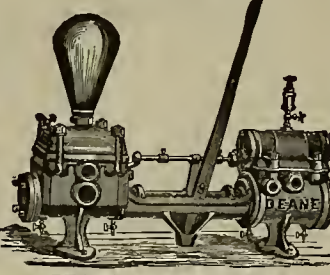
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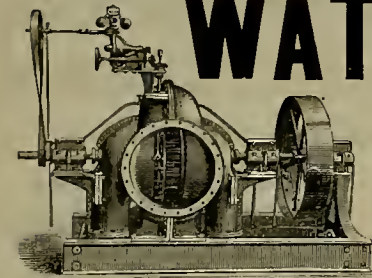
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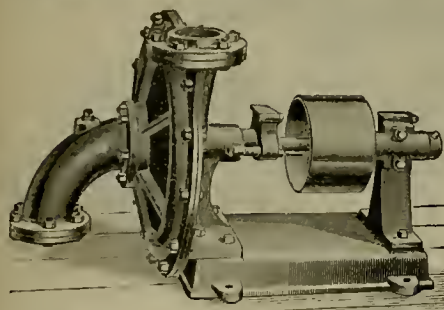
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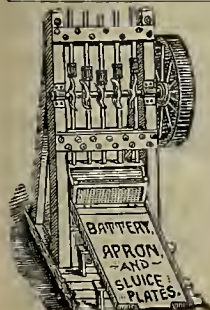
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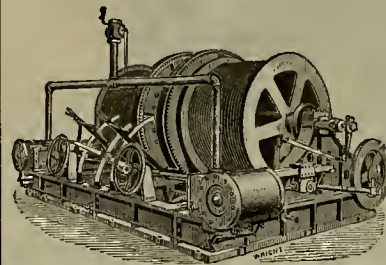
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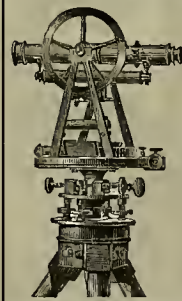
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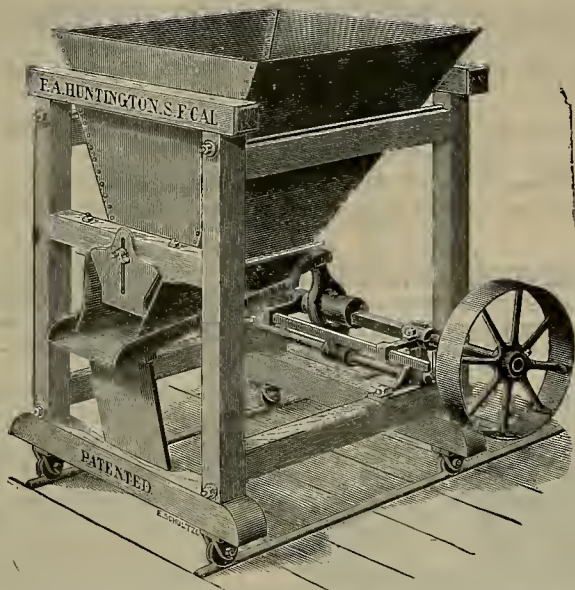
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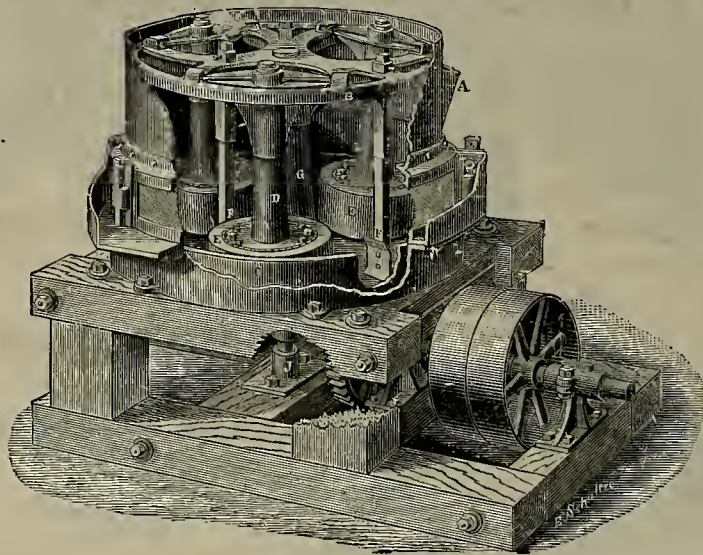


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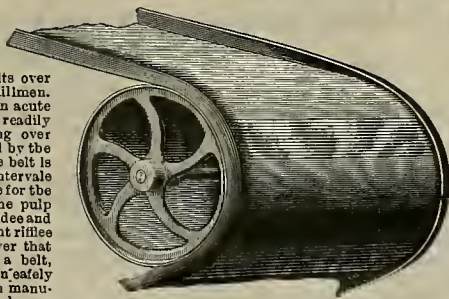
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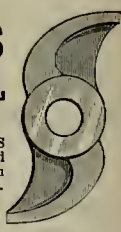
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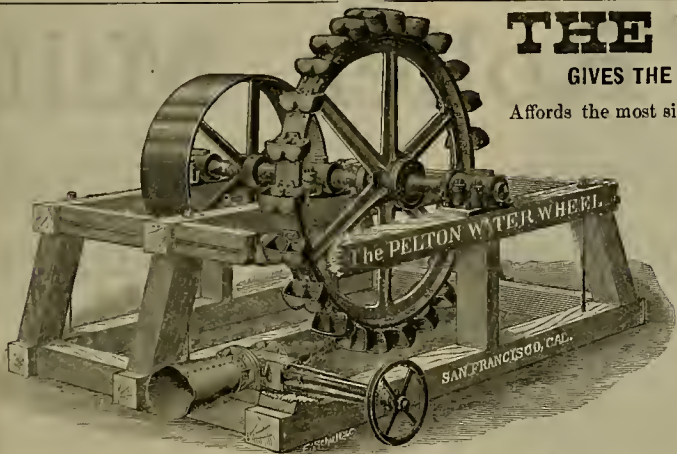
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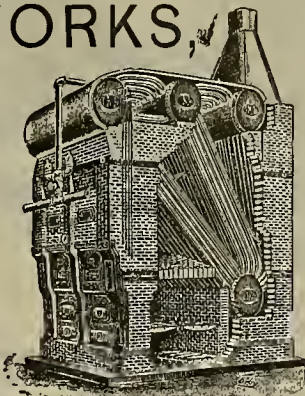
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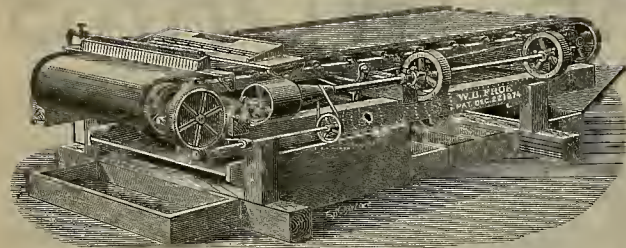
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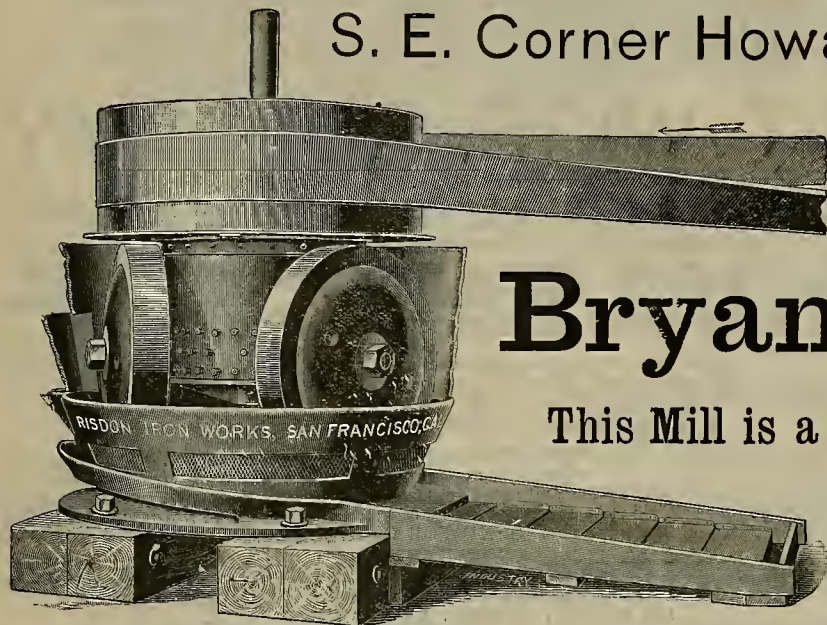
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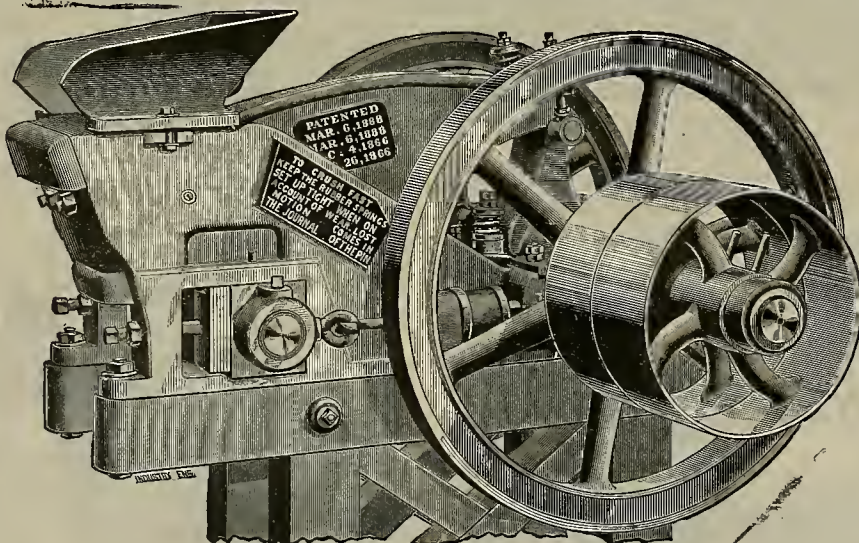
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OWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, APRIL 23, 1892.

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The New Pulsometer.

The pulsometer steam pump is a piece of mechanism, the operation of which, though simple, is not always clearly understood. In form it is a single piece of casting formed in one piece, consisting of a pair of working chambers, side by side, joined at their top ends by tapering necks with a third chamber situated between them. These three chambers are connected at or near their bottom ends with certain passages, which are covered with suitable valves, and are also provided with an inlet and outlet opening for water, and at their top ends with means for connecting with a steam pipe leading to boiler.

It is only necessary to place the pulsometer in the desired position, and connect it with the proper suction and delivery pipes and with a steam supply, when it will, by opening the steam valve, perform within its scope all that the most complicated steam piston pump can do.

Its two working chambers fill and discharge alternately just the same as a steam pump, but it has no piston. The level surface of the water within the chamber serves as a piston.

The steam enters at the top, or neck, of pump, and passes into whichever chamber the position of the steam ball valve permits, and pressing upon the surface of the water therein, forces it down and out past the discharge valves and through the discharge pipe. So soon as the water line has been forced downward to the discharge outlet, the steam above it instantly condenses, owing to the peculiar construction of the pulsometer, and a vacuum is formed, and the chamber in consequence suddenly fills again.

Now, while the steam is entering this chamber, which we will designate as the "left-hand" one, the steam ball valve is seated over the entrance to the "right-hand" chamber, preventing the entrance of steam thereto, but so soon as the sudden collapse of steam occurs, it is instantly drawn over to its seat at the entrance to the "left-hand" chamber, thus cuts off the admission of steam thereto, and allows it to enter the other chamber and expel the water therefrom in the same manner as described for the "left-hand" chamber.

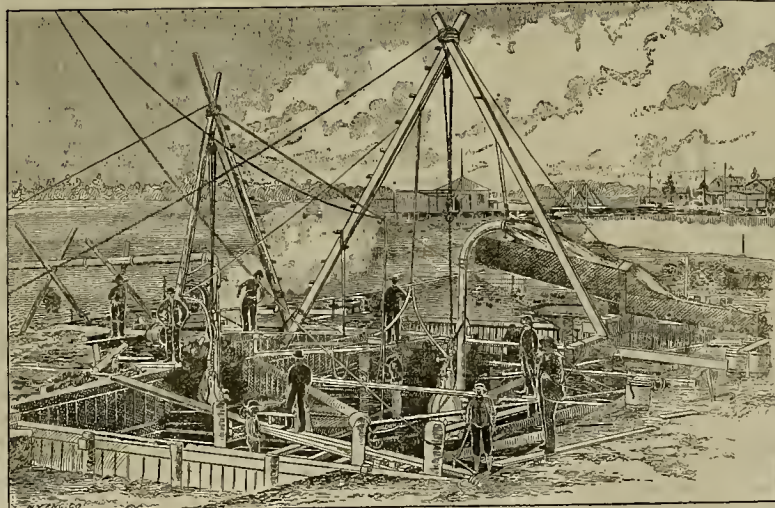
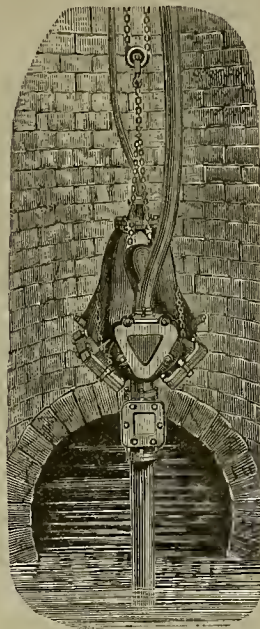
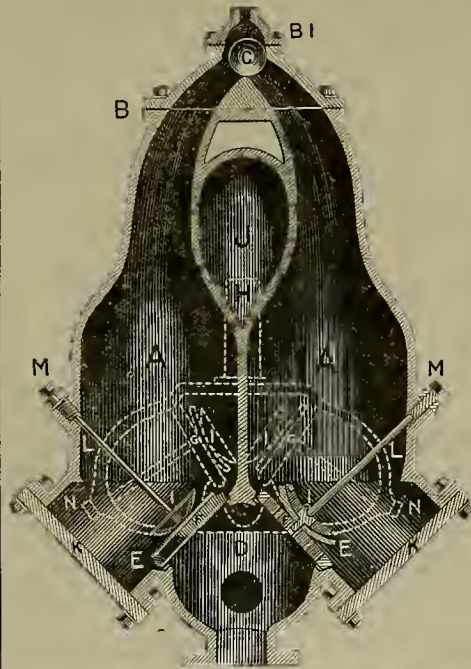
The steam and water occupy the same chamber alternately, and will thus alternate, keeping up a continuous outflow as long as steam and water are supplied.

Referring to the sectional view, it will be seen that this pump consists principally of two bottle-shaped chambers, A, A, joined together, with tapering necks bent towards each other, to which is attached, by means of a flange joint, B, a continuous passage from each cylinder leading to one common upright passage, into which a small ball C, is fitted so as to oscillate with a slight rolling motion between seats formed in the junction. These chambers also connect by means of openings with the vertical induction passage, D, which openings are so formed that the valves, E, E, and their

seats, F, F, may be easily inserted. The delivery passage, H, which is common to both chambers, is also constructed so that in the opening that communicates with each cylinder can be placed the valves and valve-seats, G, G, of the same style as in the induction passage. I, I, are valve-

the suction seats, valves, and guards, are tightly pressed to place.

M, N, are brass socket headed bolts by which the discharge seats, valves, and guards are drawn down to place. A small brass air check-valve is screwed into the neck of each chamber, A, A, and one into



THE PULSOMETER AND SOME OF ITS APPLICATIONS.

guards to prevent the valves from opening too far. J represents the vacuum chamber, between the necks of chambers A, A, and connects only with the induction passage below the valves, E, E.

K, K, are flanges covering the openings to the respective chambers, so as to facilitate the removal therefrom of valves and seats when necessary. Vent plugs are inserted into these flanges, for the purpose of drawing off the water to prevent freezing. L, L, are rods extending from the valve-guards to the set-screws, M, M, by which

the vacuum chamber, J, so that their stems hang downward. The check-valve in the neck of each chamber, A, A, allows a small quantity of air to enter above the water, to prevent the steam from agitating it on its first entrance, and thus forms an air piston, preventing condensation. The check-valve in the vacuum chamber, J, serves to cushion the ramming action of the water consequent upon the filling of each chamber alternately.

Requiring no foundation, the pulsometer may be hung up or set down in any convenient place. In a suspended position it is

used for making wells and shafts, and in positions where it is impossible to make a foundation for a pump. It may be hung from a projecting beam or from a pole or tripod and arranged with suitable tackle to be lowered or raised. Flexible steam and water connections are provided for the purpose. In quarrying and rock excavations, where blasting is necessary, the appliance may in a moment be lifted out of danger by a derrick and put quickly in position again. Two of these applications are shown in the engravings. The Parke & Lacy Co. of this city are the local agents for this appliance.

Another Ship-Building Plant.

It has been definitely settled that the Risdon Iron Works of this city will start a ship-building plant shortly, the only question now being the exact location. The city of Vallejo, on the straits at the head of San Pablo bay, opposite the Mare Island Navy Yard, offers the works 40 acres of land, all the necessary water frontage, and a handsome bonus in money if they will put the plant there. This offer is tempting, but it is hardly probable it will be accepted, owing to the distance from the city. Oakland is a much better place, but all that has been offered over there is a series of resolutions of the Board of Trade and a general principle promise of aid.

But resolutions and general principle offers of moral aid, do not build shipyards. The Kentucky corporation which controls the water front of Oakland is by no means liberal in its views, and wants an exorbitant price for its water frontage. In addition, the land for the works must be purchased and the plant provided.

Other cities in the United States which are alive to their own advancement generally lend some practical aid to an industrial institution employing many men. But Oakland has earned no reputation for enterprise in any direction, and seemingly does not care for it.

A big ship-building plant such as the Risdon people contemplate will be a good thing for the place where it is located. A couple of thousand men will be employed, the direct and attendant advantages of which are easy to recognize.

The Union Iron Works have practically demonstrated our capability to build vessels of any class here on the Pacific Coast, and as the Government appears to intend building many more vessels for its navy, there is room for other yards as well. It is manufacturing establishments such as these which will build up and maintain the cities around San Francisco bay. Our industrial establishments are now far too few, and every encouragement should be given to new ones, especially those which are to carry on business on a large scale. This port is destined to be a great ship-building locality, and it is a matter of congratulation that an institution with the reputation and standing of the Risdon Works should have decided to establish a new and first-class plant.

The MacArthur-Forrest Process.

Experiments in the Metallurgical Laboratory.

[In view of the increasing interest in all details concerning the MacArthur-Forrest process, we republish the following articles, furnished to the MINING AND SCIENTIFIC PRESS by C. W. Merrill, giving the results of experiments carried on at the metallurgical laboratory of the University of California. The object of the experiments was to give the process an impartial investigation as to theory, and to look into its practicality as far as possible on a laboratory scale.—EDS. PRESS.]

The following is a brief outline of this process taken from the statement of J. S. MacArthur before the Society of Chemical Industry, as published in the journal of that body for March 31, 1890.

"The ore is ground to about the fineness of sea sand, * * * this is then mixed with a solution of cyanide. * * * The ore and solution are then stirred for about six hours.

* * * In practice the time required is determined by direct experiment. When the gold is known to have been dissolved, the pulp is discharged into an ordinary filtering tank, where the filtration may, if necessary, be assisted by suction, and where the ore is washed by water or by the waste cyanide from a previous operation. * * On allowing the cyanide of gold solution to trickle through a mass of zinc (prepared in a form like sawdust, porous and with a large surface of bright metal,) we found that it trickled out gold-free, and better still, we found that the action became more vigorous and pronounced after a portion of the gold had been precipitated on it. * * *

When the gold has been deposited, it is necessary to separate it from the excess of zinc present. * * * The filiform mass of zinc with gold powder adhering is vigorously shaken in water, when the gold falls off and the fibrous particles of the zinc may be collected in a sieve. The gold settles easily, is collected, and fused directly into bullion."

The above was the method in its infantile outline, and below will be found a minute, detailed description of the process as it is said to be carried on at the mills of the company, or licensed by the company, at the present time. I quote from the circular of the company possessing the United States patent rights and from the description of a plant in Idaho, as described in the MINING PRESS of May 22, 1891.

The ore (usually sulphurets) is crushed dry to pass a 40 to 60 mesh screen. It is then mixed with the cyanide solution in proportions which vary from two parts by weight of ore, equal to one part by weight of solution to equal parts. The solution may be from one-eighth of one per cent to one per cent of pure KCN, according to previous experimental determination on a small scale with the given ore. The mixture is then agitated, either in revolving barrels or in ordinary pans with stirrers, for a period varying from four to eight hours, after which it is drawn into a tank provided with a false bottom for filtering. After filtration the ore is washed either with water or with waste solution from a previous operation. The filtrate and washings are then run slowly through a filter of zinc turnings. The barren solution may then be tested volumetrically with silver nitrate for the amount of active cyanogen, and regenerated by the addition of KCN to the required strength. The gold is shaken from the zinc turnings and recovered as above described. Whenever necessary, zinc turnings are added to the filter.

Now, being desirous first to see if there was anything in the process, I performed a series of experiments, using one assay ton (about 30 grms.) of concentrates, sampled to 80 mesh and not acid in reaction, and 200 cubic centimeters (200 grms.) of one-half per cent solution, the proportion being, as seen, one part ore to nearly seven parts solution. These mixtures were placed in bottles and agitated in a Taylor shaker for about six hours, and then filtered through paper filters and carefully washed with a volume of water equaling the volume of solution used. The filter papers and contents were then removed and dried, the papers burned and ash mixed with the tails, which were then assayed by the ordinary crucible method. I treated thus six ores, and the results will be clearly seen by the following table:

ORE.	Ore Assay in Ounces.		Tails Assay in Ounces.		Percent- age Extracted	
	Au.	Ag.	Au.	Ag.	Au.	Ag.
I. (a) Oregon Pyrites.....	18.825	15.35	13.38	11.02	26.32	26.7
(b) Oregon Pyrites.....	15.3	12.6	14	17.69		
(c) Oregon Pyrites (4% solution).....	13.85	9.97	26.4	35		
II. Zinc Blende Concentrate.....	1.545	3.44	.93	2.69	39	21.8
III. (a) Calaveras Pyrites.....	5.925	32	.82	17	56.16	45.13
(b) Calaveras Pyrites (treated twice).....	.3	10.39	93.83	68.47		
(c) Calaveras Pyrites (treated twice).....	15.26	11.8	2.97	1.72	80.14	85.42
IV. Shasta Pyrites.....	2.355	.775	.51	.29	78.35	72.58
V. Alaska Pyrites (treated twice).....	2.11	.68	.38	.09	82	34.48

By examining the results it will be seen that the percentages of gold and silver dissolved by the solution vary from 14 to 95, and 17.5 to 85 respectively. Being satisfied by experiment a on ore III that a large amount of the solution dissolved out 86 per cent of the gold and 45 per cent of the silver, I immediately went to work to test the second step in the process; *i. e.*, the precipitation of the gold and silver by zinc. This I did in connection with experiments *b* and *c* on the same ore (III). I treated them as I have described in the first part of the paper, except that I filtered them through sand filters and saved the tails and filtrates, introducing into the latter narrow strips of sheet zinc, which had been rolled out very thin and exposed a bright surface. The instant the zinc was put in, action commenced, the liquid became cloudy, bubbles of some gas escaped, and the zinc gradually became coated with a brown powder. In order to give this step in the process a fair trial, I allowed the zinc and solution to be in contact until no action resulted, when bright zinc was introduced. This took about 24 hours. Then, having removed the zinc, I filtered the solution, which collected any suspended particles in the filter paper. I then dissolved the zinc in dilute sulphuric acid and filtered the solution thus obtained, which contained suspended particles of gold and silver, through the same filter that I had used previously, so that I had all the gold and silver content. I thus treated the two solutions *b* and *c* of III. I now burned the filter papers carefully at a low red heat in roasting dishes and then removed the ash and contents to two scorifiers and scorified with 15 or 20 grams of test lead, cupelled and parted. I thus recovered from *b*, 5.22 milligrams gold, which equals 88.1 per cent of the gold content, and 16.26 milligrams silver, or 50.81 per cent of the silver content. From *c* was recovered 5.17 mg. gold, equaling 87.26 per cent, and 15.75 mg. silver, equaling 49.23 per cent. Having saved the tails, with the sand from the filter, I subjected each to a second treatment, saved the solution, and treated it as in the case of the first, and obtained from *b* .34 mg. of gold, equaling 5.73 per cent, and 5.65 mg. of silver, equaling 17.66 per cent; from *c* .45 mg. of gold, equaling 5.78 per cent, and 6.01 mg. of silver, equaling 18.78 per cent. Next assayed tails, and the result will be found in the tabulated statement below.

"b."					
First Sol.	Second Sol.	Tails.	Totals.	Assay Value	Per Cent of Assay Value Extracted.
Au. 5.22 Per Cent. 88.1	Au. 5.22 5.73	Au. 6.08	Au. 5.91 98.91	Au. 5.925 1.0	Au. 93.83
Ag. 16.26 Per Cent. 50.81	Ag. 5.65 17.66	Ag. 10.39 32.46	Ag. 32.29 100.93	Ag. 31 1.0	Ag. 68.47

"c."					
First Sol.	Second Sol.	Tails.	Totals.	Assay Value	Per Cent of Assay Value Extracted.
Au. 6.77 Per Cent. 87.26	Au. 4.5 7.59	Au. 3 6.06	Au. 5.92 99.91	Au. 5.925 100	Au. 94.85
Ag. 6.01 Per Cent. 49.23	Ag. 6.97 13.78	Ag. 28.03	Ag. 32 68.06	Ag. 32 68.06	

These experiments, as is easily seen, show conclusively that the zinc will precipitate all the gold and silver, if given time enough. As I see no reason why, on a practical scale, the pregnant solution cannot be made to run as slowly as desirable, the problem of the precipitation of the gold and silver, when once in solution, would seem to have been perfectly and neatly solved. This statement, however, must be modified in case the waste solution is to be regenerated. In this case, the minimum time in which the gold and silver will be precipitated must be ascertained. The zinc replaces the gold going into solution as a double cyanide of zinc and potassium. Now the amount of zinc that goes into solution varies directly with the time. The amount of cyanogen in this combination, $Zn(CN)_2 \cdot 2 KCN$, is totally inert, as regards further solvent power, as gold or silver will not replace zinc in such a combination, and only a double cyanide of a metal with an alkali is soluble. Thus it is seen that the longer the zinc and solution are in contact the less of active cyanogen (for dissolving gold and silver) will remain.

Being assured of the principle of the process and the practicality of the precipitation, I set to work to test the practicality of getting the gold and silver into solution, taking the proportions given as used in the Idaho plant, above spoken of, *i. e.*, 2½ parts ore to 1½ parts of solution, the solution to vary in strength from one-eighth of one per cent to one per cent, as determined experimentally. For this purpose I selected three ores, *i. e.*, the Oregon ore (which yielded in above experiments 20 per cent), the zinc blende concentrates (40 per cent), and the Calaveras sulphurets (92 per cent). I took four charges of each ore consisting of:

Ore 1 A. T. = 30 grms. (at prox.)

Solution = 30% = 18 grms = 18 cu. cm.

Charges No 1 was of ¼ of 1 per cent.
" " 2 " ½ of 1 per cent.
" " 3 " ¾ of 1 per cent.
" " 4 " 1 per cent.

The cyanide used showed by quantitative analysis about 50 per cent KCN, so for a 1 per cent solution would use 2 per cent by weight of the cyanide to 100 per cent by weight of water. The ores were tested as before and found neutral. Calcium chloride was added to the solution to neutralize any hydrate that might be present (as per directions), and the mixture of ore and solution was then agitated for eight hours. The experiments with the zinc ore gave anomalous results, which I afterward ascertained to be due to the fact that the ore contained 50 per cent silica, 37 per cent zinc blende, and 7 per cent galena, and had, owing to the great difference of specific gravity of the above components, become streaked in the bottle; in other words, was not homogeneous.

The results on the Oregon pyrites and Calaveras pyrites will be seen in the following table:

OREGON ORE.		CALAVERAS ORE.	
Per Cent Extracted.		Per Cent Extracted.	
1½ sol.....	3.1 10.5	1½ sol.....	Lost. Lost
2½ sol.....	17.1 19.4	2½ sol.....	51.4 20.2
3½ sol.....	13.5 14.2	3½ sol.....	63.8 19.1
4½ sol.....	10.7 14	4½ sol.....	37.4 24.8

The above results show, first, that the process is certainly a failure on the Oregon ore, from which 90 per cent of the assay value has been extracted by chlorination; second, that 85 per cent of the assay value of gold and silver may be obtained from the Calaveras ore by a one per cent solution, using 1½ parts solution to 2½ parts ore. I shall discuss the economy of the process further on. I was now reasonably certain that while the process might be made to work on some ores, the statement that it is without a peer as regards all refractory ores, and that "the most refractory ores can be treated for from \$2.50 to \$5 per ton," was not apparent from any actual test that I had seen. I was now desirous of finding out, if possible, why the process would extract so well from one ore and be such a failure on another. I thought this might be due (1) to the proportions of free gold mixed with sulphurets, or (2) to the chemical composition of the ore and its consequent action on the solution, or (3) to the manner in which the gold is imprisoned within the sulphurets, *i. e.*, whether each minute grain of the sulphurets contained the gold in such a mechanical form as would expose every particle of the gold successively to the action of the solution or whether the gold was so finely divided and so completely enclosed by the sulphurets as not to be subjected to the solvent action of the solution.

To test the first, I tried amalgamation and found that the Oregon ore yielded absolutely nothing, while the Calaveras ore yielded only a trace, *i. e.*, about 4 per cent, while the zinc ore yielded 33 per cent of Au by amalgamation. I could draw no satisfactory conclusions from these investigations. I next obtained quantitative analyses of these ores, which were as follows:

Oregon.	Zinc Ore.	Calaveras Ore.
SiO ₂.....23.10%	SiO ₂.....49.31%	Nearly pure.
Fe.....36.590	Cu......18	FeS ₂ + SiO ₂
S.....33.620	Fe......6.43	
Asenic.....6.304	Pb......6.39	
Sb......522	Zn......37.69	

From these again I did not care to draw any conclusion, except as to the zinc ore, which will be given below, without experimenting with a greater variety of ores of similar composition.

Then I took one-half A. T. of each of the three ores and roasted with N_2HCO_3 , obtaining the metallic oxides and N_2SO_4 . I then leached out the N_2SO_4 , and treated the residues repeatedly with strong nitric acid, panning off the sulphur, etc. Then finally I examined the residues with a strong microscope, such as is used in petrographical work.

(1) The Oregon ore showed no trace of gold in any form.

(2) The zinc ore showed the gold to have

occurred or collected into one minute filiform nugget.

(3) The Calaveras ore showed also a nugget, but in addition several granules of gold about one-tenth the size of the nugget. I believe from the above investigations (1) that the gold in the Oregon ore is so fine and so completely surrounded as not to be accessible in the raw sulphurets to the solution. (2) That zinc having the greatest affinity of all the known metals for cyanogen, rendered the KCN inert, according to the following reaction:

$4 KCN + ZnS = K_2S + Zn(CN)_2 + 2 KCN$
N, or possibly the formation of some sulphocyanide, the main point being the union of Zn with CN by direct combination or replacement, and thus causing the process to become partially inoperative in the case of the zinc ores. (3) That the gold was so combined mechanically in the Calaveras ore as to be almost completely accessible in the pyrites; and gold having a greater affinity for CN than iron, would displace iron in solution if the CN were insufficient for both. When I introduced KHO into a waste solution, after removing the gold, I obtained a precipitate of ferrous hydrate, which, on exposure, oxidized to the brown ferric hydrate, showing beyond the possibility of a doubt that some iron had gone into solution.

SOLUBILITY OF GOLD.

Noticing that Dr. Johnston, the chemist of the State Mining Bureau, found that it took dental gold 48 hours to dissolve in a quiescent solution, and also that the amalgamation results on the zinc ore would indicate considerable free gold, I tried 26.46 mg. gold in the amount of solution that would be used on that amount of gold, if contained in five assay tons, *i. e.*, about \$100 ore, on which the process is said to be most successful. That is, I took 5×18 cu. cm. or 90 cu. cm. of one per cent solution, and found that at the end of eight hours shaking, it had entirely dissolved, thus showing that if the gold was free and accessible in the zinc ore, as the microscopic examination would indicate, it would have dissolved had the KCN been a live and no zinc present.

ECONOMY OF THE PROCESS (WITHOUT REGENERATION.)

The most favorable ore experimented on assayed in gold 2.32 ounces to the ton and in silver .72 ounces. Of this was extracted, with a one-half per cent solution, using equal weights of ore and solution, 84.5 per cent of the gold and 66.7 per cent of the silver. Counting gold at \$20 per ounce, and silver at \$1 per ounce, the assay value of the concentrates was \$47.11. In chlorinating according to the reduction works in California, a return of 90 per cent would be made at a charge of \$20 per ton. That is, \$22.40 would be returned. Now, in the following estimate, I do not claim strict accuracy, but only the closest approximation that I am able to make. The prices for KCN and zinc were given me by a well-known dealer in San Francisco and were for large quantities. For one ton ore, according to above, we would need 2000 pounds multiplied by one-half per cent, equaling 10 pounds pure KCN. Now, platers' cyanide is said to contain 60 per cent KCN, therefore would require 16½ pounds platers' cyanide (which is the cheapest of the three grades sold per percentage of purity) at a cost of 45 cents a pound. That is at a cost of \$7.50. The replacement of the gold by the zinc uses but very little sheet zinc, which may be obtained for 7½ cents per pound. It would seem that a superintendent and one laborer could tend to a plant capable of reducing 10 or 12 tons a day, and the power required is very slight. To make a liberal estimate, including the consumption of zinc, and without taking into account the regeneration of the solution (which point I did not hear of in time to look into), I should say that \$10 per ton would easily cover the running expenses of a plant to reduce the above sulphurets. The first cost of plant where the ore has already passed a 40 mesh is very slight, merely consisting of revolving barrels, or tubs with stirrers, filtering tanks and zinc filter, with a few storage tanks. The above estimate, if correct, means a return of \$37.11 per ton in place of \$22.40. I need hardly call attention to the obvious advantages possessed by the process as regards mechanical manipulation. By far the greatest, however, is the doing away with the expensive and disagreeable roasting furnaces. The filtering in the case of sulphurets is ready and would seem to possess no difficulty. But as for the process being a panacea for all rebellious ores, I do not think the experiments of the owners themselves, some of which are as low as 65 per cent, show that, and I am certain that mine have not.

In the above, I am aware that many of my deductions may have been hasty, and I would be pleased to hear from any one on any such point.

The Great Mining Tunnel.

Adolph Sutro's Experience with It.

Adolph Sutro recently delivered an interesting lecture before the mining students at the University of California. In speaking of the development of the Comstock, he said:

New obstacles now developed themselves, one of which was the rapid increase of heat. As a usual thing, the increase of heat in nearly all parts of the globe amounts to one degree of Fahrenheit for every 60 feet of descent. On the Comstock the increase was more rapid, and when the mines had reached a depth of 2000 feet, it was a common occurrence to find the thermometer in the lower drifts rise to 110 degrees and over. Such a temperature, in an atmosphere saturated with moisture, is almost unbearable, and it would often take three men to one pick; that is to say, one man would work ten minutes or thereabout, and then retire to the cooling station, while the second man took his place, to again retire in order to make room for the third man, and so the rotation went on during eight working hours. The miners received \$4 per day. In this mode of working, a day's labor amounted to \$12.

I visited Nevada for the first time in the early spring of 1860, and, traveling over the country, saw at a glance what an advantage to the mines a tunnel would be driven into the mountain from the valley of the Carson.

Actual work on the tunnel was commenced in 1869, and it is my special object to allude to its construction and some of the obstacles encountered.

At first all the work was performed by hand labor, and the progress was slow; but as more ample means were procured, drilling machinery driven by compressed air was introduced and the advance was more rapid, amounting to an average of 300 feet per month.

Ten, twelve or fifteen holes would be drilled in the face on each side, going toward the center, so when all these holes were charged with dynamite and exploded by electricity a wedge-shaped mass of rock would be blown out from the center to a depth of six or eight feet, and afterward more holes were drilled on the side and similarly exploded, making an advance for the whole width of the tunnel of six or eight feet or thereabout.

After the tunnel had penetrated some thousands of feet, the air became worse and worse, and the heat commenced to increase. It was therefore necessary to have (besides the air derived from the drills) additional air thrown in by means of blowers placed at the mouth of the tunnel.

Here I will note a curious fact, which I have never seen explained, and which is worthy of close investigation by means of experiments. We found that the compressed air used for driving the machine drills, after having been compressed and expanded, and discharged from the drills, was not wholesome to breathe, and the men and mules would all crowd around the end of the blower pipe to get fresh air suitable to be inhaled by the lungs.

Whether the air in being compressed has parted with some of its oxygen or become vitiated from some other cause, I do not know, and I hope that this subject will at some future day be carefully examined into.

Speaking of mules, reminds me of some of the peculiarities of these intelligent animals, which were extensively utilized in the underground workings. We soon found that horses would not do, for if anything touched a horse's ears, it would throw its head upward, and so be apt to injure itself, while a mule, if anything touched its ears, very wisely dodged.

We had as many as 200 mules employed in the transportation of debris from the works and otherwise. Going along through the tunnel a torch would be fastened in the mule's head, but coming out of the darkness into the sunlight their eyes became dazed, and returning into the darkness from the bright sunlight the mules could not see anything and stumbled about, so a remedy was found, and that was to bandage up one eye before coming to daylight, which bandage was removed after the mule had reentered the tunnel, thus enabling it to see perfectly with that eye.

In driving the tunnel all the length of four miles many obstacles were encountered. As regards the surveys, it was not an easy matter to keep a perfectly straight line, for sometimes observations had to be made at short distances on account of the mist, and the slightest variation in centers would throw it to one side or the other.

After the tunnel, however, was completed and the connection made with the shafts at the Comstock lode, the foul and moist air was driven out within the first 24 hours, and for the first time daylight was seen from its farther end, appearing as a small, tiny star of the fifth magnitude.

If the tunnel had been driven a few miles more daylight would have been lost altogether, though the opening at the mouth was quite large.

In this connection, speaking of surveying, we had another curious experience.

Under the Act of Congress the Sutro Tunnel Company was given a right in all the mines discovered for a width of 2000 feet on each side of the tunnel for its whole length. When the time came to survey this grant, application was made to the General Land Office at Washington for the survey of those 4000 feet. The law provided that 2000 feet should be projected at the tunnel level, but the Land Office at Washington proposed to run the lines on the surface to that width, to which we objected, for a line measured 1500 feet or 2000 feet under ground would have a greater width projected up in the surface, being a portion of the radius of a circle commencing at the center of the earth; it would have given us several feet more on the surface, which might have been of great value in that country of bonanzas.

The Land Office, however, refused to make that projection, and so we had to accept the 4000 feet as measured on the surface.

In driving the tunnel we encountered all sorts of ground, nearly always rock, some as hard as flint, and some of ordinary hardness. In very hard rock, the drills striking against it would illuminate the face of the tunnel with a thousand sparks, and give the men and the machinery quite a ghastly appearance.

At many points great bodies of accumulated and often hot waters were struck, which came out through the crevices with such force as to throw the men down. At still other points great bodies of clay were encountered, especially when approaching the Comstock lode. This clay, after being cut through, would swell, and timbers 16 inches square would break in two like mere reeds. The pressure in some places was so great that a cap 16 inches square, placed on posts of the same dimension, would be found to be pressed through by the posts within 24 hours, showing an almost inconceivable force. In one place the track did swell up every day, and had to be cut down 13 times before it remained level.

The heat in the face, though very high, could be endured on account of the fresh air constantly being blown in, but a few hundred feet back of the face the air would be insufferably hot, and so much deprived of oxygen that a candle could not be kept lighted.

In the dry atmosphere of Nevada, electricity accumulates very rapidly in the human body, and I could, first walking over the carpet, on almost any day, with my fingers light the gas. This was the cause of several accidents. We had a special house for the storage of electric exploders, and two men in charge of this house were terribly injured at different times through touching the wires of these exploders with their naked fingers, which caused several thousands of them to explode together. One man was killed outright, being penetrated with thousands of pieces of the copper which forms the exploder caps, while the other poor man lost his eyesight. This last accident occurred, notwithstanding the precautions which had been taken to make the men, before entering the exploder-house, wet their shoes, while on the floor of the house was placed an iron plate connecting by means of wires with the water flowing below to carry off the electricity.

Then followed a graphic account of the various theories on the origin and formation of the Comstock lode, and the difficulties of mining at great depths, and how they had been overcome.

The lecture concluded with a display of excellent lantern slides illustrating the lecture, which Mr. Sutro had prepared in London and which were thrown on a screen by Prof. Christy.

MINING IN GREAT BRITAIN IN 1891.—

From the report of Her Majesty's Inspector of Mines for the year 1891, which has just been issued, it appears that during the year 1891 the total number of persons employed in and about the mines in the United Kingdom of Great Britain and Ireland, together with the Isle of Man, and inclusive of those employed on private branch railways and tramways, and in washing and coking coal on premises adjacent to or belonging to the mines, amounted to 707,411, of whom 6112 were females above ground. The number of persons employed in and about the mines, exclusive of those employed on private branch railways and tramways, and in washing and coking coal on premises adjacent to and belonging to the mines, was 687,878, of whom 5819 were females working above ground, the aggregate increase being 32,581 compared with the preceding year. The total number of fatal accidents was 961, and the total number of deaths occasioned thereby 1030, being an increase of 62 in the number of fatal accidents, and a decrease of 176 in the number of lives lost, compared with the totals of the preceding year. There was one death for every 668 persons employed, which is more favorable than the ratio, one in 543, of the preceding year. In the mines classed under the Coal Mines Regulation Act, the total quantity wrought in the different districts was 197,693,592 tons, of which 185,479,126 was coal and 29,150 ironstone, the rest being fire-clay, oil shale and other minerals, making a total increase of 3,087,705 tons, compared with the preceding year, there being an increase of 3,864,838 tons of coal, but a decrease of 888,326 tons of ironstone. There has been a continuous increase in the output of coal since 1873, the quantity raised last year exceeding that of 1873 by nearly 57,000,000 tons. The quantity raised has increased since 1887 by 23,361,314 tons.

WARNER & SWASEY of Cleveland, Ohio, have secured the contract for remounting the telescope of the Naval Observatory at Washington, which means that all the present machinery of the telescope is to be discarded and replaced by the latest designs of Warner & Swasey. They are also to put in the elevating floor, dome, etc. This telescope, until recently, was the largest in the country, the glass and its mounting complete being furnished by Alvin Clark & Sons. The glass is entirely satisfactory, as of course all Clark glasses are, and that is to be retained; all else is to be new.

NOT DEAD ON THE DESERT.—A Deputy Customs Inspector from the Mexican line, in the neighborhood of Campo, on the border of the desert, arrived in San Diego on the 15th inst. He reports that the Pegleg searching expedition of Doran and Bell, who were reported a few days ago through a dispatch from Los Angeles as having perished on the desert, were at Campo when

he left on Wednesday alive and well. They will rest there a few days and then continue the search for the lost mine, of which they had so far found no trace.

Duties of Mining Superintendents.

Laws to be Obeyed in California.

Attention is called to a decision of the Supreme Court of California on the duties of Mining Superintendents, as defined by "An Act amendatory of an Act entitled an Act for the better protection of the Stockholders in Corporations formed under the laws of the State of California for the purpose of carrying on and conducting the business of Mining." Approved March 30, 1874. Passed the Assembly March 9, A. D. 1880. Passed the Senate April 16, A. D. 1880. Approved April 23, A. D. 1880.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

Section 1. . . . It shall be the duty of the Superintendent on the first Monday of each month to file with the Secretary an itemized account, verified under oath, showing all receipts and disbursements made by him for the previous month, and for what said disbursements were made. It shall also be the duty of the Superintendent to file with the Secretary a weekly statement, under oath, showing the number of men employed under him, and for what purpose, and the rate of wages paid to each one. He will attach to such account a full and complete report, under oath, of the work done in said mine, the amount of ore extracted, from what part of the mine taken, the amount sent to mill for reduction, its assay value, the amount of bullion received, the amount of bullion shipped to the office of the Company or elsewhere, and the amount, if any, retained by the Superintendent. It shall also be his duty to forward to the office of the Company a full report, under oath, of all discoveries of ores or mineral-bearing quartz made in said mine, whether by boring, drifting, sinking, or otherwise, together with the assay value thereof. All accounts, reports, and correspondence from the Superintendent shall be kept in some conspicuous place in the office of said Company, and shall be open to the inspection of all stockholders.

A RECENT DECISION.

The case of *Manuel Eyre vs. A. K. P. Harmon, et al.*, No. 13,497, in the Supreme Court of California, was decided December 30, 1891. This was an action brought by the plaintiff as a stockholder of the Consolidated Imperial Mining Company, a mining corporation formed under the laws of California, to recover from the defendants, who were directors of said corporation, a penalty of \$1000 for the alleged failure to have made and posted in the months of October and November, 1888, certain accounts provided for by the statute for the better protection of stockholders of Mining Corporations, approved April 23, 1880. Statutes of 1880, page 400.

In reversing the judgment of the Superior Court of San Francisco, Judge De Haven said:

The only reports directed by Section 1 to be made are the weekly reports of the Superintendent, showing the work done in the mine, the amount of ore extracted, from what part of the mine taken, the amount and assay value of the ore sent to mill for reduction, the amount of bullion received and shipped to the office of the Company, or elsewhere, and the amount, if any, retained by the Superintendent; and the other report, in relation to discoveries of ore, to be made on the occasion of such discovery.

The statute proceeds on the theory that the stockholders, whether in the minority or majority, have a right to be informed as to the manner in which the business of the corporation is being conducted, the receipts and disbursements, the number of men employed and the wages paid each, and also the value of the bullion shipped from time to time, and how much ore or bullion remains with the superintendent; and also whether any discoveries of ore have been made in the prosecution of the work, which, if known, would affect the value of the mine in which they own an interest. The means by which the stockholders are to receive this information are provided with great particularity in Section 1. These means are: 1st, full and complete books of account to be kept by the Secretary, and to be open to the inspection of the stockholders; 2d, the monthly balance sheet, or in place thereof an itemized account, to be posted in the office of the Company, and lastly, the reports of the superintendent, which are to be forwarded to the office of the Company, and kept there subject to the inspection of stockholders. Now, undoubtedly, it is the intention of this law that all of these accounts and reports shall be made as directed. There is nothing unreasonable in what is required, and it is the duty of the court, unless there is some fatal omission which defeats its intention, to so construe the statute that it shall have effect. It is urged that the duty of making reports cannot be compelled, because no penalty is imposed upon the superintendent for a failure to make them. This argument, however, does not meet the real question involved here, which is only, whether the Act

has made the directors of the corporation liable for their failure to have these reports made.

THE DIRECTORS ARE THE GOVERNING BODY

Of the corporation, and as such have the power to employ the superintendent, to prescribe his duties, and to dismiss him if he fails to discharge such duties. They have the right to direct the superintendent to make these reports, and if such direction were given in good faith, it would doubtless be obeyed, as it would be unreasonable to suppose that officer would refuse to obey when such action might insure his dismissal from their service. Now, it was in view of these obvious considerations, which must have been in the minds of the legislators as men of ordinary experience, that the act in its penal clause addresses itself to the governing and controlling body of the corporation, and makes the directors liable for a failure to have made the reports referred to in section one. This does not, as respondent contends, make the directors liable for the mere neglect of the superintendent, without any fault on their part. The statute is both remedial and penal in its nature. Its general purpose is to secure to stockholders their right to have general information of the manner in which the business of the corporation is being conducted, and in order to enforce this right they are permitted to institute actions for liquidated damages for a failure on the part of the directors to give them the information referred to in the statute; and in order to justify a recovery, it must appear that there has been an intentional disregard of the law—a willful neglect to comply with its requirements. Under this construction, directors are only liable for a willful and intentional failure to have the superintendent perform his duty. Impossibilities are not required of them, but only that they shall in good faith direct this officer, who is at all times subject to their control, to obey the positive requirements of the law in the matter of these reports.

The fact that the mine is being operated in a distant State or Territory does not place it beyond the power of the superintendent to make these reports. They are not required to be on file on the first Monday of the month, or at any other particular date; they are to be made and forwarded weekly, and if so made will be received weekly, and that is all that is required, and this is easy of accomplishment. The reports in regard to discoveries of ore are only to be made upon the occasion thereof.

As thus construed this statute imposes NO UNREASONABLE BURDEN UPON DIRECTORS.

Of this class of corporations. It requires only good faith and common honesty in their management of property intrusted to them, and enforces from them a proper regard for the rights of those for whom they are trustees, so far at least as giving information of the working and development of the mine, and of all receipts and expenditures and discoveries attending the same. It is true that this class of statutes in their penal clauses ought to be strictly construed; but this rule does not mean that when the intent and object of the law is plain, such object may be defeated by an over-nice construction. In the language of the Supreme Court of the United States, in *U. S. vs. Hartwell*, 6 Wall. 396: "The rule does not exclude the application of common sense to the terms made use of in the act in order to avoid an absurdity, which the legislature ought not to be presumed to have intended." To hold that the word "reports" as found in the penal clause of this act is meaningless, is not only to refuse to give effect to a word which, in the connection used, obviously and naturally refers to the reports of the superintendent, which by section one are required to be made, but such construction defeats the general purpose of the statute itself. But it is a general rule, applicable to the construction of penal as well as other statutes, that no word is to be eliminated from a section by the Court if a sensible meaning can be given to it, unless by giving such word its meaning the real object of the statute would be defeated. With much greater reason is the Court required to give effect to each word in a sentence, when not to do so is to deprive the law of the vitality necessary to secure respect for its commands. Applying this rule, there is no difficulty in the construction of section three of this act. It simply makes the directors liable to the penalty named for a willful failure to have such reports made and accounts posted as are referred to in section one. If the directors cause the reports of the superintendent to be made, and the monthly accounts to be posted as required by the statute, the law is complied with; otherwise not, and they incur the statutory penalty if the failure to do so was intentional on their part.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, April 16: The heavy storms being apparently over, the taking out of the water in the Hector mine was recommenced this week, and it is to be prosecuted vigorously at the rate of 3330 gallons per hour. At this rate the mine will be clear down to the 200-foot level in about two weeks. Mr. Valentine says a temporary belt will then be made for the purpose of cleaning out the tunnel, and putting men to work on what ore they can find. Thomas Valentine has been up with a party of surveyors, looking up boundaries, etc., and no doubt they mean business.

AMADOR CITY.—We are glad to report that the Gover mine is looking well. They are taking out some fine looking rock from the 700-foot level. It is the intention of the South Spring Hill Company to sink a new shaft south of the present one. For this purpose the surveyor has been on the ground this week surveying.

AMADOR QUEEN.—Ledger, April 16: The pocket of metal struck in Amador Queen No. 2 has been extracted. It amounts to about 70 tons. An assay has been made, which gave \$100 per ton. At this rate it ought to yield a very handsome profit over all expenses.

KIMBALL.—A. W. Kimball is busy prosecuting work on his mining claim in Pioneer district. He is down 150 feet, and the ledge has widened out to three feet. He has a large quantity of rock on the dump, but none has been crushed as yet. Estimates place it at a very high grade. His claim gives the denial to the generally accepted theory that quartz veins in that region pinch out at a trifling depth. One hundred and fifty feet is deep sinking for that district, and the fact that the ore-body is widening instead of narrowing at this depth is calculated to give renewed confidence in mining in the upper section of the county. The fact is, the mines have never been prospected to any depth. The rich veins have been worked until they pinched, and that has been deemed conclusive of the complete exhaustion of the mineral treasure. The same apparent pining out of the vein has been met with time and again on the mother lode, but, after passing through the barren ground, the ledge has reappeared. It is not improbable that the same may be the case in the eastern districts of Amador county.

MISCELLANEOUS.—The sinking operations at South Eureka have reached over 500 feet. They are now employed in making the sump, about one-half of which has already been sunk. When this is finished, which will take probably a couple of weeks, drifting for the ledge will be commenced. Everything looks favorable, and those interested have a growing confidence that it will develop into a paying property. F. Mace says that the asbestos ledge mentioned in last issue is located on the banks of Sutter creek, about four miles from town. He has not sunk on it at all, but followed it five or six feet into the bank, and that it is fully six feet wide. Such an enormous body of this mineral is worth looking after. It is in contact with a vein of serpentine. The ledge is solid and compact, apparently unmixed with any deleterious substances.

El Dorado.

RICH ROCK.—El Dorado Republican, April 11: At the Genie Annie mine the owners have discovered a body of very rich ribbon rock, which has been uncovered in the tunnel for a distance of 150 feet in length. In the bottom of the tunnel the ledge is from 12 to 15 inches wide, and a few feet above the tunnel it closes out. A shaft has been started and as it goes down, the ledge is found to retain its richness and is rapidly widening. It is believed that a valuable body of ore will be developed.

Humboldt.

COAL.—Cor. Watchman, April 16: The recent discovery of oil in the southern portion of the county recalls to my mind several instances of the discovery of coal deposits in this county. In 1861 I discovered a vein of coal within three miles of Hydesville. I dug up and packed from that vein five horse loads, all of which, with the exception of 60 pounds taken to Eureka, was used in the blacksmith forge at Hydesville. The coal burned with a large blaze like hickory, leaving a great deal of ashes. The casing of the coal in the mine was hard sandstone. The vein was about a foot thick at the surface, but grew more narrow as I descended. Within about a hundred yards I found a spring with gas coming up out of it, which burned when I touched a match to it. At the time located and marked some trees there, and I can now direct any one to the place. There is another vein about 12 miles from Hydesville. About a mile from the last mentioned mine there is a vein three or four feet thick, and I near that still another vein nearly a foot thick.

Inyo.

TIN AND GOLD MINES.—Cor. Reno Journal, April 16: Deep Springs mining district, 20 miles northerly from Big Pine, has a veritable boom coming to the front with the first showing of a splendid tin deposit. W. H. Ihlmeyer and Antone Cunah have three locations, and show a communication from the Mining Bureau of California informing them that they have what has been found only in two localities hitherto, to wit, domestic tin. Samples will be sent to the University of Nevada for analysis. M. H. Bush has struck a fine five-foot ledge in his claim lying a mile and a half from Alford Station and three and a half miles from Big Pine. This lead is well

defined, and the rock works \$28 per ton in gold, consequently its owner is not handicapped by the coinage racket. The Fish Springs camp, eight miles south of here, is turning out a steady output.

Mono.

BONIE CONS.—Miner, April 15: During the past week east crosscut No. 1, 700 foot level, was extended eight feet. We are stopping out some \$30 ore from above south drift, 500 foot Jupiter shaft level.

THE MONO.—North drift No. 2, 600 foot level, was extended 14 feet. There is a formation of 12 inches of quartz and clay. The ore stops above 700 continue about the same as last report. In the ore stop below south drift, 700, the ore will average from 6 to 11 inches, and is very rich. The mill was kept running steadily.

PINE NUT.—Bodie Miner, April 15: George H. Bump returned this week from a trip to Pine Nut mining district, in which he and Andrew Smith are interested. Mr. Bump spoke very highly of the outlook of the district, and said that considerable good ore is being extracted. The mine that he is interested in is about three miles east of the Mountain House. The ledge, which is a short distance below the surface, is about eight feet wide, running north and south and pitching to the east, with porphyry formation. The owners are so well satisfied with the prospect that they will, in a few days, commence a tunnel that will tap the ledge at a depth of 400 feet.

Nevada.

NEW YORK CONSOLIDATED.—Grass Valley Union, April 16: The New York Consolidated is the name of a quartz location of 1500 feet on Kate Hayes hill, of which James Burke is the principal owner and has been running a tunnel for some months. The ledge has recently been struck where the vein shows a width of two feet, and presents a favorable appearance. The vein is now to be drifted upon. The tunnel is at a lower point than has ever been reached on the ledge, and will serve the purpose of surface drainage, and for prospecting purposes.

CENTENNIAL.—Virginia Enterprise, April 17: A letter from Superintendent Richards to the secretary, W. S. James, Gold Hill, gives the following information to the owners of the Centennial, nearly all of whom are Comstockers, although the mine is situated in Nevada county, California: "I started one man to work down from the surface a few days ago, and we made connection, completing the upraise, to-day. It is 310 feet from the top of the main tunnel to the surface. The opening is 25 feet higher than the bed of Deer creek, and we have a splendid draught of air throughout both the tunnel and the incline, giving the best of facilities for future work. The main tunnel is in 140 feet beyond the foot of the upraise, making a little over 2200 feet from the mouth of the tunnel to the face. I propose to keep all the men working in the face for the remainder of the month, unless otherwise directed." The upraise mentioned was started last fall for air and water purposes, and the survey turns out to be correct. All the water required for gravel-washing purposes can now be easily sent down the incline from Deer creek, and it will not be long before the ledge and valuable gravel bed already developed will be made financially available. The latest gravel strike, at the face of the tunnel, prospects good pay. It is of a fair washing character, and contains more and coarser round wash boulders than heretofore met with, indicating the approach to or presence of the long anticipated back channel.

JACK RABBIT MINE.—Telegraph, April 15: Captain James Hamill, the foreman of the Jack Rabbit mine, informs us that they have a large ledge in the bottom of the shaft and it is "lively" quartz. The shaft is driven 250 feet and is in good ground and is still going down. An 8-inch pump is being put in place at the Jack Rabbit and will soon be in operation.

ORLEANS MINE.—A crushing of 15 loads of ore from the Orleans mine has just been completed at the Rodgers mill and it paid about \$40 per load. The ore came from a point near the Empire line. Work is going steadily on at the mine and everything indicates that a valuable property will soon be developed.

AN IMPORTANT SALE.—Nevada Transcript, April 9: What may prove an important transfer was recently made in this city, when the Yellow Diamond claim, about 3½ miles west of town, changed hands. This property, which has for many years been in the possession of A. J. Ragon; Mrs. A. Jamieson, Ralph Locklin and Mr. and Mrs. Benj. Locklin, has been sold to G. B. Chittenden, S. B. Ladd, A. F. Dunnington and others of Washington, D. C. The Yellow Diamond has been thoroughly prospected, and is known to be a good ledge. Assays of the ore range from \$37 to \$266, and where last worked the ledge was six inches thick. The company have in all 4200 linear feet on the lode, with its two extensions. The promoters of the enterprise are forming a stock company at Washington and will organize with 100,000 shares at a par value of \$10 each, with a working fund of 50,000 shares.

TRIBUTE QUARTZ.—Ambrose Powning and Thomas Duncan are taking out quartz on tribute from the Orleans ledge, and crushings have run from \$34 to \$42 per ton.

WASHINGTON.—Cor. Transcript, April 13: Fritz Meister and company, on Canyon creek, are doing nothing on their property to speak of. They are waiting till the roads are in condition so they can get lumber in from the saw mills, when a new mill will be built and other improvements made on their property. Donabne and Stewart, owners of the Maryland ledge, Micawber like, are waiting for something to turn up. At the German mine there is nothing new to report, except that a 3-foot ledge has been struck in the lower tunnel which shows freely in galena, sulphurets and a fine sprinkling of free gold. The main tunnel is now in about 500 feet, which will give backs of nearly

or quite 250 feet. A. E. Baugh and Supt. Calahan of the Eagle Bird mine have quite recently bonded the Blue Jay quartz mine for one year from the present owners. It is their intention to develop the property for the purpose of making a sale to other parties.

Placer.

DRIFTING.—Placer Argus, April 16: We learn from T. B. Everett, secretary of the Placer County Miners' Association, that the Harlon drift mine, three miles south of Loomis, is employing about 30 men. They are working two shifts, and running their mill constantly, with an average crushing of 45 tons per day. Their clean-ups average \$2400 per week, of which 60 per cent is clear profit. The gravel is taken entirely from drifts and laterals for development of mine, no breasting being done. This mine is the property of W. P. Harlon. Jas. Laird is superintendent.

San Bernardino.

THE NEW PROCESS.—Cor. Cal. Farmer, Miner and Oil Reporter, April 16: The trouble with miners here is the absence of reduction works. This difficulty is likely to be removed. The smelters put up at the Needles will be of great benefit in this direction; but we are to have another nearer home. The Silver Mountain district, San Bernardino county, has again the appearance of renewed life and vigor. A small syndicate of Los Angeles gentlemen, composed of M. M. Morrison and A. C. Banson, formerly real estate brokers at 139 S. Broadway, and E. L. Doherty, Mr. Canfield and Mr. Renchler, who have been long known in the various mining camps of the southwest, have recently stepped to the front, backed by the new MacArthur-Forest process for the extraction of gold and silver. The gentlemen named above have purchased the right to use it at their mills on the Southern California railroad, about three and one-half miles northeast of Oro Grande. This plant is now being remodeled and refitted with a view of treating the ore of their own mines and doing general milling. It is claimed that this process will solve the problem of successfully treating the low grade ore of this part of the State (or at least the most of it). There is some ore here that even this simple process cannot handle. Experimental work has already commenced at the plant, but they do not expect to be in good running order until after the first of May; after which time, the capacity of the plant will be increased according as the demands warrant.

Shasta.

READY.—Shasta County Democrat, April 15: Everything is in readiness at the South Fork reduction works for the machinery which, up to last Monday, had not arrived at Anderson. The roasting furnace is completed and under cover. Two miners named Booth and Gillen, the former lately from Idaho and the latter from French Gulch, have taken a lease on the South Chicago mine in South Fork mining district, and Monday shipped out a camp outfit. By the time the reduction plant on South Fork gets in running order, they expect to have out considerable high-grade ore. Major Lyons, who has owned and been developing the old Martin mine near Churntown, for some months past, is greatly pleased over the showing his mine is making. He claims an ore chute 2000 feet in length, and where development work has been done it shows up more than average milling ore. He expects to thoroughly prove and develop the property by running a tunnel into the mountain from the Sacramento river side and mill the ore from the mine on the river. Mr. H. L. Coleman, representing the Edison Electric Supply Company, was last week, visiting the Cline Gulch and Squaw Creek mines. He visited the Uncle Sam mine last Sunday in company with Fred Grotefeld. From Mr. Grotefeld we learn that the Gladstone Mining Co. has contracted with Mr. Coleman for an electric power plant, which the company will put up on Clear creek, where water power can be had, and with this power run all the machinery at the Gladstone mine, several miles away. The machinery for the electric plant will be supplied from the manufactory in the East. We also learn that the Uncle Sam Mining Co. contemplates putting in the same kind of power.

WHITE OAK.—Shasta Courier, April 16: We understand that Mr. White of Lower Springs was offered a good round sum in hard cash for his White Oak mine, but refused to sell for less than \$10,000. Jim Sutherland and the Early boys are keeping their team arastre steadily running on good rock from their mine on north fork of Middle creek, a half mile west of town. It is reported that negotiations are going on for the sale of the Tiffin, Penrose and other mines in Lower Springs district. The Schroter Bros.' cannon ball mill on Rock creek, near town, is running steadily, pulverizing rock from the Ed Reese mine. If no heavy storms or unfavorable circumstances intervene, the Iron Mountain silver mine will be running before the middle of May. The management of the mine has added many improvements to the already extensive plant, and a force has been busy since last winter completely overhauling the works and putting in more machinery, and when the stamps are again in motion the bullion-producing capacity of the mine will be almost doubly increased. One of the proposed improvements is an electric light plant. The "J. Y. Smith" mine, on the Middle Creek road, which is owned by Parker of Sacramento, has been attached by Joe Penrose. Some time ago, Parker bonded a mine of Penrose for \$10,000, agreed to do a certain amount of work on it, and also bonded other mines in this locality. The money was not paid, nor improvements made, hence the attachment. The Smith mine may be sold to a Shasta party, and the matter will then no doubt be adjusted to the satisfaction of all. Jos. Bell has put a force of men to work on the Sunny Hill mine.

MINING FOR PROFIT.—Redding Free Press,

April 16: Some months ago E. P. Connor bonded the Crossbow and Sky Blue mines to Arnold Becker for \$5000, part of the money paid down. This week the balance was paid. Mr. Becker has organized a strong company, which is developing the property. After the bond had been given, Mr. Connor made a prospecting trip above the Tower House, and after camping out for three months and crawling through the brush, discovered a ledge on which he sunk an incline, laying bare for 25 feet ore that assayed \$25 to the ton. He then started a tunnel, which is at present 104 feet long, and he expects to strike the ledge in a few days, when he will have a thousand feet of ore backing. This shows what a poor man can do by judiciously disposing of property which he cannot handle and investing the money elsewhere. Had Mr. Connor bungled on to the Sky Blue and Crossbow claims, without the money necessary, he would to-day have nothing wherewith to buy grub. Now he has money and as good a mine as he sold. The Calumet Company start up their mines the coming week, they being now only 200 tons ahead of their milling work. Ore is now being hauled from the Ohio group of mines, on Flat Creek, to the Shasta mill for working by the MacArthur-Forest process.

Siskiyou.

QUARTZ VALLEY.—Cor. Yreka Journal, April 13: Owing to the recent rains the miners in this section are having plenty of water, and the general expression is, Are you working on the day or night shift. The Allen Bros. have commenced crushing and expect to run through about 400 tons, having already 300 tons on their dumps and in the mill. This will be the largest crushing ever made in this vicinity. R. H. Campbell is working a large crew of men in his hydraulic mines, and is running continuously. I understand the English syndicate with whom he has been negotiating, intends expending \$20,000 toward prospecting the main channel, running down the east side of the valley, and that Mr. Campbell has gone to San Francisco to procure the necessary machinery for sinking. This will be looked forward to with interest, as it is the general belief that the east side of Quartz valley is very rich. The Stockton Gravel Mining Co. is still taking out money by the hatfuls. Their gravel has been paying for the last three weeks from \$40 to \$60 to the set of timbers and bears every indication of being a permanent thing. This is one of the richest strikes made in this section of the country for a number of years. This company has 80 acres of patented ground, besides several minor locations. Their gold is fine in quality and coarse in character, more than half being found in nuggets weighing from \$5 to \$50. It is supposed to have come from an old river channel, underlying the mountain a short distance to the south. This channel is plainly traceable, and in all probability very rich. A great many thousand dollars were expended in early days in efforts to reach the bottom, but all labor in that direction was eventually abandoned. The Howard Bros. of this valley are now running a tunnel which they think will cut through the rim in 1000 feet. They have over 600 feet completed. The companies engaged on Shackleford creek are making preparations to open extensive mines. Don't know just what they are doing. However, the daily explosions of giant powder cartridges in that direction, puts one in mind of a China new year. Burk and Lewis have struck a very rich bunch of ore in the Pinkham ledge. The quartz fairly hangs together with gold. Dave Starr has also very rich quartz in his ledge at the head of Hull's gulch. He is making big money with a hand maul.

MINING NOTES.—A couple of strangers discovered a rich ledge of quartz on old Craggy, at Humburg creek, last week, and are now getting out a supply for crushing at Hunt's quartz mill. Van Nader, who found a wide ledge on Humburg creek a few weeks ago, has had a quantity crushed at Hunt's mill, which pays exceedingly well. Henry Marion is busily engaged in driving a tunnel in the old Louis Fahl quartz ledge which he purchased lately, and will soon be able to get out a large quantity of good-paying ore. Judge Spencer's quartz mine on Humburg continues to keep the McCook mill constantly busy, with the quartz yielding handsome returns. The Allen Bros. at Quartz valley are taking out very rich quartz from their ledge at present, and having put in hoisting works and other machinery, will do better this season than ever before.

WING DAM.—Yreka Journal, April 20: One of the most extensive wing dams in the county is now being built by a Chinese company at Klamath river, about 2½ miles above Oak Bar. It is over 200 yards long, and built at Dorgett's ferry, a large number of hands being employed. The river has been paying very rich during former years at that point, and a big haul of gold is expected this year from the extraordinary efforts put forth toward scooping up the bedrock deposits in the old river channel of prehistoric times.

THE BALLARAT COMPANY, sinking down to bedrock under the cement bottom of the old Chinese hydraulic claim at Spring gulch, just north of town, started their steam engine again last Wednesday.

NEVADA.

Washoe District.

CON. CAL. & VA.—Chronicle, April 16: 1650 level—Have been repairing the upraise carried up 50 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from the winze No. 3 (down 73 feet) in working upward from that point. From the north end of the California ground on the west side are working in the old stopes and extracting therefrom some ore of fair quality.

1750 level—In east crosscuts Nos. 1 and 3 from the main south drift have continued to extract some milling ore.

1800 level—Along the south end of the drift

running south from the crosscut run east from the winze No. 1 sunk from the 1750 level, we have continued to extract ore from the sill floor upward of milling value. The east crosscut from the bottom of the winze No. 1, sunk 22 feet below the 1800 level, has been extended 11 feet; total, 31 feet; continuing in a quartz formation, showing some ore of milling value. There has been extracted from all parts of the mine during the week 1110 1760-2000 tons of ore, which were shipped to the Eureka mill. The average assay value of the ore worked at the Eureka mill during the week, 1045 tons, was \$19.85.

ORINE.—1465 level.—From the mouth of the north drift, from the drift run west from the winze 122 feet below the sill floor of the 1300 level, have continued our work in an easterly direction and extracted some ore therefrom. There has been raised to the surface during the week 2½ tons of ore, the assay value of which is \$19.37 per ton.

MEXICAN.—On the 1465 level the south drift from the crosscut running east from the bottom of the winze, 32 feet east from the winze, has been advanced 20 feet; total, 74 feet, continuing in porphyry and clay with quartz of low assay value.

UTAH.—The west drift from the shaft station, 340 level, has been extended a total length of 510 feet; drift continues in porphyry formation, showing clay separations and a little water.

SIERRA NEVADA.—The joint Sierra Nevada and Union west drift, 900 level, was extended during the week 23 feet, making its total distance west of shaft 1843 feet; face in porphyry. The north drift from the Kenosha tunnel was advanced 41 feet; total distance, 907 feet; face in porphyry.

UNION SHAFT.—The joint Sierra Nevada and Union west drift from the shaft, 900 level, has been extended during the week 23 feet, making its total distance west of shaft 1843 feet; face in porphyry. The east crosscut near south line from south lateral drift, 1570 feet west of shaft, 900 level, has been extended during the week 20 feet, making its total length 40 feet; face in porphyry with seams of clay.

BEST & BEICNER.—900 level.—West crosscut No. 1 has been advanced 22 feet, through porphyry and stringers of quartz; total length, 177 feet. Still on repairs in east crosscut No. 1.

GOULD & CURRY.—200 level.—Northwest drift, 435 feet west of shaft, has been advanced 20 feet through soft porphyry; total length, 196 feet above 200 level. East crosscut No. 4 from south drift has been advanced 12 feet; total length, 22 feet; face in soft porphyry.

HALE & NORCROSS.—On the 900 level, east crosscut above this level advanced during the week 25 feet; total length, 70 feet. After cutting the east clay, stopped work in the face of this crosscut. About 45 feet back from face, have started an upraise in the ledge. Top of this upraise is all in quartz yielding low assays. Winze near north line on t is level sunk 10 feet; total depth, 35 feet; bottom in quartz, but of no value. 1100 level.—The stopes above and below this level continue to yield the usual quantities of ore. Extracted from this level during this week 343 tons of ore. 1450 level.—Stopes yielding about as usual. Extracted from this stopes during the week 116 cars of ore. 1500 level.—Stopped work in stopes south from bottom No. 1 winze. Have men on repairs where needed in the mine. During the week have hoisted 459 cars of ore and shipped to the Brunswick mill 436 440-2000 tons. Average battery assay of ore worked at Brunswick mill for the week, \$16.24. Shipped to Occidental mill about 110 tons of ore for a trial run.

CHOLLAR.—Are making repairs on the 450, 650 and 750 levels. The east crosscut on 1610 level, 150 feet south of north line, is out 60 feet; face in porphyry.

POTOSI.—The raise above the 1100 level is up 135 feet on the stopes; top in porphyry. The winze is now down 200 feet below the 1500 level; bottom in porphyry and quartz. The joint Potosi and Bullion west crosscut on north line, 1500 level, is out 123 feet; face in hard porphyry. Extracted and sent to mill during the week 340 tons of ore; milled during the week 351 tons; on hand at mill, 140 tons; average battery assay, \$27.50.

BULLION.—The east crosscut, 350 feet south of north line, 1300 level, is out 69 feet; last 23 feet in quartz and porphyry give low assays. The joint Potosi and Bullion west crosscut on north line, 1500 level, is out 123 feet; face in hard porphyry. The south drift, 1500 level, is out 377 feet south of north line; face in porphyry. Have been repairing southwest drift from Ward shaft, 1800 level, during the week.

WARD COMBINATION SHAFT.—Have been re-timbering the southwest drift, 1800 level, during the week.

EXCHEQUER.—There has been no work done on the 660 level during the week. Are re-timbering the joint shaft.

OCCIDENTAL.—The west crosscut from the south drift, 400 level, has a total length of 65 feet. Have started a north drift from bottom of winze, 400 level.

Ferguson District.

GORN.—Pioche Record, April 14: The feverish excitement here, following the reports of the gold discoveries made within the last ten days at Ferguson, or Monkey Wrench district, as it is generally called, has by no means died out, but with a great number continues to increase and the district is overrun with prospectors and others, principally from Pioche, all hopeful of making a stake in the new burg. The Magnolia claim, owned by the Ferguson boys, Jerry Manning and H. A. Cohn, is the first and chief mine of the district. The ledge is four feet in width, of porphyry and quartz, and carries both gold and silver, the average of the ledge in gold being reported at from \$500 to \$600 per ton. The working shaft on this claim is ten feet in depth, and the ledge at the bottom is as well defined and as rich as at the top. The

prospecting which immediately resulted from the discovery of this claim tended southerly from it, and a half dozen or more prominent quartz ledges, which before were regarded as barren, are found to be seamed with rich streaks of gold and silver-bearing ore. At a point three miles south from the Magnolia, gold quartz equal almost in value to that of the Magnolia has been located, and the country between the two points is covered with claims said to overlap each other in every conceivable shape. The biggest thing outside of the Magnolia is a reef or ledge of quartz located by Reeves, Ellis and Wilson about the first of this month. The ledge is said by one who views it to stand from 10 to 20 feet above ground, to be from 20 to 50 feet wide and over 500 feet long on the surface, and as straight almost as a line can be drawn. The ledge contains copper-stained horn silver and free gold, and the latter in sufficient quantities to show plainly in horning. Eight or more locations are placed on this reef, and the owners hold it as fabulously rich, though practically no work is yet done on it. Reports of other good finds in other parts of the district are confirmed, and, if no more are found, those already existing are of such magnitude as to justify the belief that a prosperous town or two will soon exist there. But a few days, so to speak, have elapsed since the excitement begun, and all have been scouring the country for new finds. This is beginning to end, and we will soon know definitely the average values of the ore there. Joe Goodrich has taken down an assaying outfit and should be at work by this time. Alfred Godbe proposes to open a general assay office there at once also. J. J. Manning, W. C. Glissan, James Pierson, Geo. Neshitt and the Ferguson boys have located a townsite and named it Golden City. So far, a dozen or more tents dot the streets and avenues in which the new metropolis is subdivided. This location is in the vicinity of the Monkey Wrench and Magnolia mines, but the discoveries south of these points indicate that other towns will be started below. The water question is one of great importance. The only water there, comes from several small springs, the nearest of which is three miles from Golden City. Several springs lie to the south, with several claimants to each spring, and the lawyers are likely to come in for a share of the spoils. Among those who have gone from here are Manager Eames and Supt. James of the Pioche Con. Co., who, after looking around, expressed their belief that the country was all right as a mineral section, and immediately arranged for several men to go to work on claims in which they proceeded to acquire an interest.

Kennedy District.

PROSPECTS.—Walker Lake Bulletin, April 15: W. J. Wilkinson, a miner well known hereabouts, writes from Kennedy district, Humboldt county, Nevada, to the effect that it is sure to be a good camp in the near future. He says it is not a good place for "broke" men to go to. The claims now being worked are owned by poor men who cannot afford to pay wages. It is all they can do to get supplies for themselves. It is reported that J. L. Blossom of Battle Mountain will put up a mill soon, and in that event there will be considerable work done, as the ore is plentiful and of good grade, and wood and water are convenient. Mr. Wilkinson's letter continues: This district is named after Charles Kennedy, formerly of Hawthorne. He owns one mine—the Imperial—on which we have run a tunnel 80 feet on the ledge, which averages from 18 inches to 2 feet in width, and goes \$50 in gold and \$50 in lead and silver. Another tunnel is run 170 feet, which will tap the ledge 200 feet under ground. If this tunnel gets the ledge, we will have a big thing sure, as the ledge improves in size and richness as we go down. There are some good placer diggings here. A Chinaman is here who wants to buy or lease all he can get. He has a force of 150 working at Rock Canyon (20 miles south of here) and he thinks these placers are as good as those of Rock Canyon. It is a promising camp, but there is no use of miners coming here to work for wages. When capital comes in it will be better.

Pioche District.

YUBA MINE.—Record, April 14: The new vein of ore opened in the Yuba some weeks ago, of which we made mention at the time, is found to be of considerable extent and of excellent grade. The vein is now opened on the seventh and ninth levels, at which point the work of development goes steadily ahead, four to five tons of ore being daily extracted, at an estimated net profit of \$500. No stopings or winzes are made. The ore comes out in the regular course of development. The Yuba contains a very large quantity of ore, which will undoubtedly be shipped when the railroad shall be built, and the mine is well able to stand its quota of the 150 tons a day, which it is said the Pioche Con. Co. guarantees to ship when the road is completed.

Tuscarora District.

NAVJO.—Times-Review, April 15: North drift, 350 foot level, has been started up; progress, 4 feet. The pump is working well, hauling the increasing flow of water.

BELLE ISLE.—North drift, 350 foot level, extended 6 feet; vein looking well, ore high grade. West crosscut, same level, extended 22 feet. Rock not so hard.

NORTH BELLE ISLE.—West crosscut, 400 foot level, extended 7 feet. West intermediate above the 500 foot level extended 4 feet, cutting a small vein of rich ore. No. 1 upraise, south 500 foot level, extended 25 feet; ore improving. Hoisted 44 cars of second-class ore.

NEVADA QUEEN.—Second level.—No. 1 south drift extended 23 feet and No. 3 east crosscut 24 feet; will connect the two in about two weeks. Cannot work to advantage in raises 1, 2 and 3 until the connection is made, as the ventilation is so bad. The drifts from the top of raises

were run from each about 10 feet, exposing high grade ore and looking well. In No. 3 east crosscut, passed through four feet of ore, 18 inches average assay \$336 per ton; balance average \$45 per ton. Third level.—East intermediate from top of No. 3 raise shows two feet of ore, eight inches, \$275 per ton, and 16 inches \$40 per ton. Stopes from Nos. 1 and 2 chutes continue about the same. Hoisted during the week two tons, average assay \$296 per ton, and 88 cars, \$41 assay.

ARIZONA.

DARK HORSE.—Prescott Courier, April 15: Sam Powell came in yesterday from the Dark Horse mine, owned by himself and partners, which is near the Hassayampa, in Black Rock district. This mine is a recent discovery and is being developed by two open cuts, which expose a streak varying in width from 2 to 12 feet, the ore running from \$6000 to \$7000 silver per ton. Sam had some of the ore in his pockets, which is almost pure silver. He says that Judge Wade, Bob Groom and George Munroe have a fine free-milling gold property in their King Solomon's group of mines; that their 5-stamp mill is running day and night, and there is enough ore in the mine to keep it running for years.

BIG BUG.—S. Morrison was in town yesterday from his mine in Big Bug district, an extension of the Little Jessie mine. He has several men at work sinking on a good ore chimney and will shortly make a shipment. Says the district is a very lively one. New claims are being found most every week. One hundred and seven pounds of bullion were brought in from the Hillside mine. The bullion is valued at \$10 per ounce. Two additional Free vanners will soon be added to the mill. J. O. Floyd was in from Turkey creek yesterday. He has quite a promising silver prospect on Big Bug mesa; the vein runs from one to six feet in width and assays \$400 per ton. His claim is known as the Slocum. John S. Jones came in from his mill and mining properties, Chapparal Gulch, Big Bug district, yesterday. Says the camp is a very prosperous one, indeed. That a goodly number of miners are taking ore from surrounding claims and having it run through his quartz mill, with a fair margin of profit for all concerned. Water is receding a little and he hopes for another storm.

NEW MEXICO.

PAYINO.—Southwest Sentinel, April 22: Dr. Miller's Gladys mine, on the west side of Cook's Peak district, is being operated by Martin Bros. of Deming, who are taking out and sacking about a carload of ore per week. They are paying a royalty of 25 per cent. The mine cleared \$12,000 last year, and there has never been more than five men at work on the property at the same time.

THE BOOM.—The mining boom, which was predicted some time ago, seems to have but just commenced. Although there have been some large mining sales made this year, it begins to look as though there were more important ones to follow. As soon as capitalists find out that this is the richest mineral section in the world, there will be no trouble in getting capital interested in the mines here. More work and less street corner talk will bring capital into this part of the country.

A RAILROAD.—A railroad is to be built from Florida Station, on the Atchison, Topeka and Santa Fe, to the Cook's Peak district. This road has been talked about for some time, as the output of the mines at Cook's Peak has been steadily increasing. There are large deposits of iron ore in the district, and it is believed that one of the objects in building the road is to reach these iron mines in the hope of being able to compete with the company which recently purchased nearly all of the iron mines in the Hanover district. Arrangements have been almost perfected for the erection of sampling works at Deming. A committee has been appointed to secure ten acres of ground on which to erect the works. The Minbras Consolidated Co.'s mill will be started up this week if some machinery which has been ordered from Chicago arrives in time. It is expected that it will be kept running five or six months. Work on the Cochis mill will be continued steadily until it is completed, and it is expected that it will be running on ore from the Mina Grande mine in the Pinos Altos district some time during the summer. The Surprise mine is producing ore which runs from 4 to 7 ounces in silver and averages about 40 per cent lead. Over 50 carloads of ore have been taken out of one pocket in this mine and shipped this year. Fifty tons of ore are being milled daily in the Last Chance mill in the Mogollons, and an average of \$8.50 per ton is saved. This gives a net profit of about \$3.50 per ton on all ore milled. Some ore was taken out of the mine recently which yielded \$20 per ton. The strike in the Jim Crow mine gives every indication of permanence. At a depth of 80 feet there is from 6 to 18 inches of ore, which will net at least \$1000 per ton. A shipment of this rich ore will be made this week, which is expected to return from \$4000 to \$5000 net.

OREGON.

AN ASHLAND COAL MINE.—Ashland Tidings, April 15: Nothing is too high for Ashland's prospects now. Besides having the most promising gold mine in Southern Oregon, she has just uncovered some of the finest coal ever taken from the ground on the Pacific Coast. The find is on the slope just across Bear creek from the town—less than a mile from the city limits. The croppings were discovered by Nohhy Martin and Frank Robinson in a gulch where the coal measure had been cut by erosion. The coal was tested and found to burn well. An expert miner examined the find last

week and pronounced the prospects very flattering. The land on which it is found belongs to O. Coolidge and R. K. Sutton. It was bought in a school section by them several years ago as pasture land. E. K. Brightman, Nohhy Martin and Frank Hansen have bonded the land for a year, putting up a \$100 bonus last Tuesday, and have begun surface prospect work. They find a layer of about 18 inches of coal and slaty matter, but have not yet opened it sufficiently to know much about the extent or situation of the vein below the surface. Beyond question the quality of the coal is first-class. Coal croppings have been found along the Emigrant creek cut in the hills southeast of Ashland, and if one mine is opened, others will no doubt follow.

NEW MILLS.—Bedrock Democrat, April 13: The arrival here of carloads of mill machinery from the East and West is certainly an encouraging prospect of the development of the mineral resources of this section. There arrived at the depot yesterday by the Union Pacific three large mill plants, and the machinery is now being unloaded from the cars. The three mill plants are to be erected on as many different mines. One of the plants, a 10-stamp mill, is from the Chicago Iron Works, and is to be placed on the group of mines owned by the Indiana Co., of which Mr. J. E. Meacham of this city is manager and superintendent. The machinery will be sent by wagons to the mines at once. Another of the plants arriving is a 10-stamp mill for the Virtue Mining, Milling and Development Co., and is to be placed on the old Virtue mine. A. V. Oliver, manager, located just 8 miles east of Baker City, and from which large bullion outputs can be expected as soon as the mill is ready for operation which will be a very few days, as everything is in readiness at the mine to put the mill in place without delay.

The Baisley-Elkhorn Mining Company, L. W. Nelson, manager, also received their second Bryan mill from San Francisco, the last of their shipment of machinery for the large 60-ton mill now being constructed on the Baisley-Elkhorn mine, which for the past two years has yielded an output of about \$10,000 per month with two Huntington mills. With the increased milling capacity, the Baisley-Elkhorn will take its place among the largest gold-producers in the Northwest. From every section of Baker county comes the most encouraging reports of mine development, and it is conservative to say that before the summer is over a dozen more mill plants will be erected on mines ranging in distance from Baker City of from 5 to 20 miles.

WHITE SWAN OUTPUT.—Bullion outputs from the White Swan mine have commenced again, the delay in operations for the past few weeks having been caused by a breakdown of the mill. Now that the mill has been repaired, regular bullion outputs will result. Yesterday S. B. Baisley, the manager of the mine, brought in 7½ ounces of bullion, the result of 11 days' run of the mill on the lowest grade ore in the mine. The ore now being taken from the mine, Mr. Baisley says, is as rich as ever, and the ledge keeps its width beyond all expectations.

WASHINGTON.

PLACERS ON THE SKAGIT.—Seattle Mining News, April 15: Placer mining has been carried on in a primitive way for years on the Upper Skagit river. At present this district is only accessible from British Columbia side, but a trail will be cut through from Hamilton up the river this season, which will make the trip much shorter and bring the district into greater prominence. A few hardy prospectors are already on the ground, having braved the snow and cold of the mountains and tramped 90 miles to get in there. Although only the old windmill system has been employed, the results have been quite satisfactory, as the gold in the river is very coarse. A company of Scotchmen is now making arrangements to take in pipes, etc., necessary for mining on the most improved hydraulic system. It has a bench 150 feet high and 40 or 50 acres in extent at the junction of Ruby creek and the Skagit which it will work, and which is rich in gold.

CHEWELAH NOTES.—A big strike at a depth of 320 feet in the Eagle mine, three miles east of Chewelah, is reported. The force of men will be increased at once. The mine is owned by Spokane parties. The Bulldog mine, seven miles west of Chewelah, is said to contain a ledge of solid blisnuth and silver 18 feet in width, lying between walls of marble and graphite. A concentrator is expected to be in operation on the Jay Gould within two months. The ledge on this claim is 16 feet in width and runs from 20 to 400 ounces silver. The Albino, which was purchased last winter by the colored men—Paul, Thompson & Co.—is being developed, the shaft being now 75 feet in depth, and running into chloride ore. The company will soon increase the force of men to 100 on the Capital iron mine. The shipments from this mine have averaged 60 tons per week through the winter, but with the larger force of men, a much larger output will result. The starting of the Spokane smelter would be hailed with joy by all owners of mining property in this vicinity, and a large amount of ore and fluxes could be had in the valley. Among the silver-lead claims that would be good producers may be mentioned the Eagle, Jay Gould, Fred B., Saratoga, Arlington, Enterprise, Finley, Harford, the Summit group of nine claims and a large number of others, to say nothing of a large number of copper-silver claims. Situated as the Chewelah mining district is, it can only be a question of a few months when the many advantages as a mineral producer of this district will be recognized. The Eagle mine will ship another carload of ore this week. Over 50 locations have recently been made on iron ore, and some of the top croppings are very fine.

MECHANICAL PROGRESS.

CAST IRON PIPE PRODUCTION.—The first publication of the statistics of cast iron pipe works separate from the operations of the general foundries of the country, is a recent census bulletin prepared by Dr. William M. Sweet, special agent. The bulletin shows that during the census year 1890 36 establishments reported the manufacture of cast iron pipe as a leading specialty of their business. The total capital invested in these works was \$14,300,933, which includes \$68,500 reported by two establishments not in operation during the census year. The hands employed, including officers and clerks, numbered 7788, to whom \$3,794,407 in wages was paid. Total cost of materials consumed was \$9,483,389, and the value of the products was \$15,168,682. The principal material consumed by the pipe foundries was pig iron, the quantity used amounting to 591,258 net tons, costing \$7,860,407, while cast iron pipe formed the principal product, the output being 513,030 tons of 2000 pounds, valued at \$12,556,315. The pipe foundries in operation in 1880 were tabulated with other foundries of the country, so that no data are available for comparison. There has, however, been a considerable growth in this industry during the past decade, especially in the south and west. The returns for 1890 show that 20 of the establishments reporting were built since the census of 1880.

FIBRE GRAPHITE.—The Holmes Fibre-Graphite Manufacturing Company was recently organized in Philadelphia to engage in a new industry, says the *American Manufacturer*. This is the manufacture of a material to be known as fibre graphite for bearings. It is prepared in a very simple way. Graphite in a finely divided state is mixed with wood fibre, then the mass is pressed into a mold arranged for proper drainage, and pressure put upon it, so that the fibres, guided by the escaping water, shall assume a position perpendicular to the bearing surfaces. The ends of the fibres, intimately mixed with the graphite, which is solidified under great pressure, are thus presented to the revolving journal. After air drying, the solidified mass is saturated with linseed oil and thoroughly baked. The fibres, however, are not carbonized. The result is a mass of graphite, metallic in appearance, showing no signs of fibres, except upon fracture, and presenting smooth, satiny surfaces. The material is somewhat harder than the graphite of a lead pencil, but quite strong enough to bear pressure and resist wear.

COMMON SENSE APPLIED TO PRACTICE. In a series of papers under the heading of "American Supremacy in Applied Mechanics," by Coleman Sellers, E. D., the following reference is made to the well-known Pelton wheel: "One of the most noted instances of the practical solution of a mechanical problem is given in the development of the Pelton water wheel, a system worked out entirely by and through experimentation. Results have been achieved by these improvements on wheels that were among the earliest used, so that the history of the Pelton wheel is typically American and stands as a monument of human ingenuity meeting the definition that has been given of mechanical engineering, common sense applied to practice." Such an indorsement of the Pelton system of power by so distinguished an authority will have great weight with the engineering profession, as well as afford general assurance—if such were needed—that the claims made for this extraordinary development in hydraulic force are in no way overstated.

NEW WELT MACHINE.—A new welt machine has been marketed, says the *Manufacturers' Gazette*, and is attracting considerable attention among shoe manufacturers. This machine differs from anything else in this line in existence, inasmuch as it makes a seam equally tight and close to those made by hand. The loop prevents the thread from cutting through from channel to leather in the working of light and flexible soles, while the insole and seam are prevented from being drawn out of shape by the inward pull of the needle. The machine makes no distinction in the sewing of toes of various widths, a narrow one being just as evenly and securely done as a wide one. Provision is made in the working of a narrower feather by having a single thread on the welt, as it is unnecessary to provide space for the four threads that comprise the loop stitch, and in stitching the sole to the welt, the stitch may be placed closer to the upper, leaving less margin between the stitch and upper, thus obtaining a closer

edge and a feather that will not roll up. Accompanying the welt machine, an outsole or fair-stitch machine containing many original features has been perfected.

ANALYSIS OF CHROME IRON ORE.—According to an article by Herr C. Hausserman, the moisture is determined by heating the finely powdered substance at 100° Cent., and then 0.5 gramme is mixed with 4 grammes of a mixture consisting of three parts of potassium carbonate to one part of caustic soda. The whole is first heated in a covered platinum crucible over a small Bunsen flame for two hours, after which the fusion is completed over the blowpipe, the liquid of the crucible being removed. After cooling, the crucible and contents are boiled with water in a deep porcelain dish; the solution so obtained is acidified with sulphuric acid and made up to a litre. Should a sandy powder remain in the dish, it is evident that the material has been insufficiently powdered and a fresh start is necessary. The solution having been satisfactorily obtained, titration with ferrous-ammonium sulphate is performed, the strength of the ferrous-ammonium sulphate solution having been previously standardized against pure potassium bichromate.

ELECTRICAL INDUSTRY.—The electrical industry, says the *Review*, like many another child, has at times grown beyond its strength. It has always recovered itself quickly, however, and any instability which may have been apparent has been but temporary. The business in general is now in the throes of a mild revolution and people are looking to see where and upon what they stand. Yet withal every one is cheerful and this is characteristic. There are combinations in progress and may be more to come. This we may regard as the prime cause of the present restless feeling, although not the only one. Business is good and collections are fair to middling. In this way matters are slightly compensated. A general purpose on the part of the large companies to reduce expenses, improve products and clear out the "fakirs" seems evident; good results will surely accrue from such a movement. One of the chief dangers which manufacturing companies in the electrical business must guard against is over-capitalization. The evils of this system are sure and sometimes sudden.

FENDERS FOR CARS.—It is interesting to note in the annual report of the Massachusetts Railroad Commissioners the statement that no fender has yet been found which is efficient for the saving of life. Some fenders have been tried since the introduction of electric cars, but the results are not satisfactory; on the contrary, the fenders appear to have been in more than one instance an additional peril to the person who has had the misfortune to get under an advancing car. It would seem that the invention of a satisfactory fender ought not to be difficult, but the fact that cable cars are still without them indicates that the invention has not been made. Cable cars are much more dangerous than electric, if only for the reason that their direction of travel cannot be reversed. The probability is that as people become accustomed to the swifter motion of mechanical cars, they will cease to gauge them by the slower standards of animal cars, and then there will be fewer accidents. But of course the greatest safety can only be attained by having the tracks above or below the surface of the street.—*Electrical Engineer*.

THE RELATION OF ELECTRICITY TO MECHANICS.—Electricity may and is certain to revolutionize many of the industrial methods and conditions of life and have a powerful effect on all. Yet, howsoever great this effect may be, it can but intensify and make more certain our dependence on machinery. Electricity, the great revolutionizer, banding together for instant communication the most parts of the earth; transmitting at our pleasure speech, light, heat or power. In the hands of the physician or surgeon, a gentle messenger of mercy; in those of the executioner, an avenger. Most simple of all power in its practical application; most wonderful in the diversity of its uses; most mysterious in its methods of operation; who can but watch with an absorbing interest its development in the service of man, fascinated by its mystery and marvelous works; already exerting an influence in industrial affairs little realized, except by a few, yet this influence only faintly foreshadowing that of the near future.—*The Northwestern Mechanic*.

PLATE ARMOR.—The *Philadelphia Press* has advices from London stating that an important contract was signed by the Russian Government with the Harvey Steel Ar-

mor Works of America. Their process for treating plate armor makes it 40 per cent more impenetrable to projectiles than any other treatment so far discovered. A Harvey plant will be erected immediately at the Aboukoff Armor Works, to miles from St. Petersburg, where American steel armor will be made for Russian ironclads. The Russian Government is not putting up this plant as a tentative thing, but to carry out a specific contract entered into by Government officials.

STEERING BALLOONS.—Balloons were recently used by the German soldiers, on the borders of Russia, to observe the military movements in the country last named, and some of the observers conjectured that the Germans have made great improvements in the steering appliances.

SCIENTIFIC PROGRESS.

Strength of Aluminum Wire.

Alfred E. Huot, President of the Pittsburg Reduction Co., contributes to the *Journal of the Franklin Institute* a chapter on "Aluminum; Its Manufacture and Uses from an Engineering Standpoint." From this, we take the following paragraphs:

"It will be noted that the tensile strength of aluminum wire runs up very considerably over that of the rolled metal. This is due to the peculiar property of aluminum to harden under work. The metal requires frequent annealing in rolling, and if it is to be drawn into wire with as little annealing as possible, the tensile strength is increased very considerably. This property of the metal is increased, especially if the aluminum is alloyed with a small percentage of copper, titanium or silver.

"It is perfectly feasible to produce a wire of aluminum alloyed with a small percentage of silver, titanium or copper, which will have a tensile strength of 80,000 pounds to the square inch, and which will have, weight for weight with copper wire, an electrical conductivity of 170 to that of copper being 100. When it is taken into consideration that the copper will only have a tensile strength at maximum of say 30,000 pounds per square inch, against the 80,000 pounds strength of the aluminum-titanium alloy, and when the further fact that iron or soft steel wire has only a conductivity of 17 in the same scale, and has a less or at most only an equal tensile strength per square inch with the aluminum-titanium alloy, a wide field for usefulness for electrical conductors seems opened for the metal, even at present when the price of the wire of aluminum-titanium alloy will necessarily be considerably higher; but when such an alloy can be produced in fine wire at a price of say 15 times that of the iron wire, pound for pound, then as the section can be reduced, the aluminum-titanium alloy will be the cheapest as well as the most advantageous for electrical conductors.

Two things, however, should always be borne in mind in considering the applicability of aluminum for given purposes in the arts. The first is that the properties of the metal are very considerably changed as regards strength, tenacity, hardness, rigidity and color, by alloying it with small percentages of other metals—conditions that do not materially change the specific gravity of the metal. The second is the relative weight of aluminum. Taking the tensile strength of aluminum in relation to its weight, it is in plates as strong as steel at 80,000 pounds per square inch ultimate strength, and in cold drawn wire as strong as steel at 180,000 pounds ultimate.

AIR PRESSURE DURING THE SOLAR ECLIPSES.—Observations of air pressure during a total solar eclipse reveal an influence of the latter phenomenon on the former, according to Herr Steen in *Annalen der Hydrographie*. He studied the eclipse of August 29, 1886, in this respect, using the records—at intervals of a quarter of an hour—of 14 Norwegian ships between Panama and Madagascar, of which four were in the zone of totality and at least four others quite close to it. Having first eliminated the daily period of air pressure, he groups the observations of the ships and forms means; and he finds both these and the individual records reveal two maxima of air pressure, separated by a minimum. In the totality zone the first maximum is 35 minutes, and the second 2 hours 15 minutes, after the middle of the eclipse; in the partial zone, the first is 25 minutes before, and the second 1 hour 40 minutes after, the middle. This double wave Herr Steen explains thus: During a solar eclipse day is changed to night for a short time, and the transition is much like the ordinary change from day to night in the tropics, where the

twilight is but short. There the curve of air pressure has regularly a maximum about 10 P. M., some time after sunset, and a minimum about 4 A. M., shortly before sunrise; while a second maximum appears about 10 A. M. It is natural a total solar eclipse should act similarly.

GLASS TUBES OF LARGE SIZE.—Glass tubes of large size are costly when produced by the ordinary method of blowing, owing to the fact that none but the very best workmen can produce them. The ordinary method of coating only admits of the production of short tubes of considerable thickness. In a memoir on the manufacture of glass pipes of large diameter, by L. Appert (*Bull. Soc. d'Encouragement l'Industrie Nationale*), improved machinery for casting and molding such tubes is figured and described. The molten glass in the required state of fluidity is run into a strong iron mold, which is then closed, and the workman regulates the rapidity of the passage of the spindle or core according to the dimensions of the tube. The mold is then opened and the tube taken out for annealing. With tubes of 100 mm. diameter, 15 can be made in an hour. Two metres is a usual length, which would give 30 metres an hour, but of that 20 per cent must be deducted for failures, giving an effective output of 24 metres an hour, or about 500 metres per diem. Four men and a boy are employed in the work. The power—steam or compressed air—required for driving the cone or spindle is very slight. The facility of working is greater with the larger size of tubes. The *Journal of the Society of Chemical Industry* says the method of connecting the tubes depends on the use to which they are put, metallic joints being used for tubes designed for the passage of water at high pressure.

COLORS TO STAND LIGHT.—In the treatment of fabrics to be colored, says the *Manufacturers' Gazette*, experts now declare a lizarine red and alizarine orange to be the two fastest colors of their class that can be produced to stand light. Another point emphasized is the inutility of putting together a fast and a fugitive dye in one combination; in case of a compound shade from fustic alizarine red and logwood, upon a chrome mordant, the logwood soon fades, the balance of color is destroyed, and the red or yellow becomes prominent. Alizarine blue, as compared with indigo, does not come out well; the dark dye seems to stand, but the light shades show that an active destructive action has been going on. It is concluded not to be as fast as indigo to light, but still a good color. Fustic is the fastest of all the wood colors and the fastest of all yellow dyes of any sort. Samples of wool dyed with pure fustic extract on chrome mordant, on being exposed for 40 days in different sections, inland and shore, retained a deep color, but no fresh bloom.

ALUMINUM UTENSILS.—Are aluminum utensils dangerous? Not at all, it would seem from the experiments conducted by Prof. George Lunge. He and his assistants have found that beer, tea and coffee are entirely without action on the metal, while the action of alcoholic liquors, such as brandy, is extremely slight. The influence of acid liquids, such as wine, sour milk, fruit juices, etc., is more pronounced, but practically of no importance. Besides, the salts of aluminum are not poisonous in the ordinary sense of the word. The announcement is of special interest at the moment, when aluminum spoons are being manufactured, and have been, or soon will be, placed upon the market. They may be safely used for all liquids ordinarily found in the household.

MOLECULES IN AIR.—Curious evidence shows that a cubic inch of air at sea level contains about 350,000,000 molecules. If the law of regularly diminishing density holds good, a cubic inch air at the height of 100 miles will contain about 350,000 molecules, and at less than 222 miles only 1 molecule. Opinions differ, however, as to the actual height of the atmosphere's upper surface. Prof. Young declares that no definite upper limit can be stated, while Prof. Forster of Berlin contends that a thin air, connected with that of the earth, pervades the whole solar system.—*Chicago Journal of Commerce*.

NEW METALLIC BLEND.—It is reported that a company has been formed in London under the title of Pidot's Iron-Silver and Ferro-Bronze Syndicate, limited, for the purpose of bringing into the market the new metallic blends known as iron-silver and ferro-bronze, the invention of Mr. Henry Pidot. The iron-silver, which is made on a base of iron and copper, is whiter, more ductile and malleable than nickel-silver, German silver, or oriole.

METALLURGICAL.

AMERICAN AND ENGLISH ASSAYS.—Last year the Anaconda Mining Company took a step in advance by declining to sell copper matte in England upon English terms and deductions, so far as the settlement was concerned, bills being made out and settled for at so many pence for so many pounds of fine copper; says the *Engineering and Mining Journal*. The result was not reached without some grumbling on the part of English smelters, and now Mr. Haggin has made another further and radical advance in declining to sell any longer by the Cornish assay, insisting upon the wet analysis, with the allowance of 1.3 units, customary in this country. Upon these terms 1800 tons of argentiferous matte were purchased by a large Liverpool house, followed by a second purchase of 600 tons by another smelter. Since then, large contracts have been made on the same basis, amounting to many thousands of tons. It is but a step further now to compelling all foreign buyers to accept American assays and weights, since American methods of assay and weights are conceded. In the present state of the market for furnace material it requires the concurrence of only two or three American producers to obtain this concession. As is well known, some of our largest copper miners never sell on any other basis.

ANOTHER MODE OF MAKING BRIQUETTES.—The conversion of coal dust into fuel has for a long time been accomplished by various simple methods differing but slightly in their details; but it has recently been proposed, instead of the usual plan of using pitch to cement coal dust together to form briquettes, to resort to substances of a glutinous or a farinaceous character, these including those obtained from wheat, barley, rye, or other cereal or vegetables, 5 per cent to 95 per cent of coal dust being found to constitute a suitable proportion. The mixture may be kneaded by hand and sets in a short time, so that molding under pressure may be resorted to for securing rapid manufacture. The product is said to burn with less smoke than the ordinary briquettes, and it is claimed that, in the matter of cost, the new article is the more economical. Ashes or refuse matter from coal fires, with or without fresh coal, may also be utilized.—American Manufacturer.

STEEL VS. IRON.—There has been considerable talk of late to the effect that steel is fast taking the place of iron, and that in consequence the iron-working industry is rapidly declining. There is no doubt that there is some truth in the statements, but in the opinion of some of the most prominent iron workers, the iron business is not knocked out, but only crippled for the present. D. B. Oliver, when asked by the *Manufacturing Gazette*, whether the iron business will be crowded out by steel, said "No. While the iron business is very depressed, I am not of the opinion that it is going to be knocked out completely because of the advantages that exist in the manufacture and in the uses of steel, and its supreme adaptability to so many purposes formerly filled by iron. The use of steel will be constantly on the increase, but there are uses for iron that steel will not meet so well, and there will still be a demand for it."

REFRACTORY BRICKS OF MAGNESIA AND CHROME IRON ORE.—Herr Leo ignited a sample of magno-chromite from Tampadel in a Deville blast-furnace to ascertain its capability of withstanding the temperature of an ordinary open-hearth steel furnace. The sample had the composition: Chromic oxide, 35—42 per cent; ferric oxide and alumina, 19—22 per cent; magnesia, 16—18 per cent; and silica, 3—5 per cent. The lining of the Deville furnace was of magnesite, and a magnesia brick and a Dinas fire-brick were heated at the same time for the sake of comparison. The result of the experiment shows that the chrome iron ore and the Dinas brick were completely fused, while the magnesian lining and the magnesia brick were unaffected by the heat and unattacked by the fused sample.

THE LAST OF ANTIMONY MINING IN GREAT BRITAIN.—Antimony is about to disappear from the periodical statistics relating to the metalliferous mineral production of Great Britain. The Glendinning antimony mines, situated at Westerkirk, in Dumfriesshire, have just been definitely closed, and most of the machinery has been sold. The mines were first discovered in the year 1760, but they were not regularly worked until the year 1793. The ore, which was sulphide, yielded about 50 per cent. Operations in the mines were discontinued

a quarter of a century ago, but of late years work has been taken up by a company, which has now, however, been forced to forego bringing the ore into a market at a loss, the price of antimony on the London market having declined to barely £50 per ton.

ANTI-SULPHURIC ENAMEL.—Acid spray from a battery of accumulators is said to be a great deteriorating agent where metal fittings and brass or copper conductors are about. A London firm set to work and invented an anti-sulphuric acid enamel, which is now largely used in many electrical works. For coating woodwork, iron and copper in the neighborhood of batteries, it seems to have proved itself thoroughly successful, and the long list of names of electrical firms using this enamel shows its usefulness. Even with strong sulphuric acid it will resist for weeks. It is also a perfect protection against acid spray. It is applied exactly like varnish, in black or other colors.

ELECTRICITY.

A Test of Electrical Rock Drilling.

An instance of successful electrical rock drilling says *Stone*, is the one afforded by the Government work at Rock Island, Ill., where it owns the largest arsenal in the country, and for some time has been engaged in deepening a portion of the southern channel of the Mississippi, which here flows from east to west. This is done with the two-fold purpose of securing a more plentiful supply of water power, which is used at the shops on the island, and to provide a navigable channel at Moline, which has heretofore been debarred by shallow water from sharing in the commerce of the nation's greatest river.

The electric drilling was employed on a strip of limestone rock 600 feet long and of an average width of 50 feet, the remainder of the rock being of a softer shaly sandstone that is more profitably drilled and feathered off by hand. Nine drills were used on the work. Eight of these were mounted tripods in the usual manner, while one, somewhat larger in size, was mounted on a carriage, and wheeled about on a temporary track. The machines used were the regular Van Depoele reciprocating drills.

Current was obtained from a generating plant installed in a temporary power house erected on the island. This building was, in addition to a rough pumping station, put up by the Government for the purpose of clearing the bed of the river from water coming from leaks in the water-dam and from springs. It was utilized in driving the generators, steam being furnished by a 40 horse power boiler. The generating plant consisted of two Thomson-Houston dynamos, with revolving brushes. It was found convenient to utilize the dynamos and circuit of the drilling plant to explode the dynamite with which the holes were charged.

The results of this work demonstrated that the use of electric power was about one-half in cost compared with hand drilling in the harder rocks. In soft shaly rocks the difference was not so apparent, mainly because comparatively little drilling is necessary in proportion to the rock taken out.

Overhead Electric Railways.

The rapidly increasing introduction of overhead trolley systems, in spite of the enormous opposition which has been brought to bear against them, especially in the cities of Brooklyn and Philadelphia, must be taken as evidence of their advantages and applicability to street railway traction. Moreover, says *Electricity*, we have ample proof of the popularity of this system wherever it has been in operation for any length of time, in the unqualified indorsement which has been given to it by the mayors and others of such cities when appealed to for their experience as to its safety and value as a means of rapid transit.

We also have the positive statement that no loss of life has ever resulted from purely electrical causes, and although any vehicle is liable to injure a foot passenger occasionally, the statistics of the West End road of Boston show that the proportion of accidents between the electric and horse car lines have been greatly in favor of the former. In spite of statistics, however, there is a large proportion of the community in cities where electric traction is proposed, who strenuously oppose it, and it would be interesting to know the grounds upon which these objections are based. The element of danger to the public has been too thoroughly investigated and disproved to be any longer an available argu-

ment. Another objection which carried some weight two or three years ago was that the system was still new and crude, and had not stood the test of time, but this is also known to be settled now in favor of the trolley system. Another, and perhaps the least reasonable argument, is that superior systems are coming up every day, which will soon put the overhead system in the background. These others have been tried and the trolley still is ahead, an example, it has been said, of the "survival of the fittest." Such an argument is, if considered seriously, of very little weight, as no advance would ever be made if railways should wait for expected improvements, as there is no system, however perfect, that is not liable to improvement. There is also an objection, purely esthetic, raised against the appearance of the street when equipped with overhead wires. But what is the disfigurement in this case in comparison to that of an elevated railroad, and who is there that questions the benefit of the latter or disputes the enormous increase in the value of business property along its route?

The agitation of this subject, which has recently been so severe in Philadelphia, has brought out all these objections, portrayed in vivid colors in the daily papers, and in this case the one possibly valid argument against the franchise has nothing to do with the merits of the system. Giving away valuable franchises to a company without remuneration to the city, is not to be defended, but extravagant abuse of a reliable and efficient system has a tendency to react in a direction opposite to that in which it is intended.

UNDERGROUND WIRES AND CABLES. In the report of the Committee on Underground Conduits and Wires, which was read at the Buffalo Convention of the National Electric Light Association last February, says the *Electrical Age*, some very important and interesting facts were set forth, but which, on account of being involved with other questions, are liable to be lost sight of. Take for instance the statement that, with very few exceptions, the system and plans heretofore adopted in laying wires and cables underground in this country have proved failures. This assertion, no doubt, was a surprise to many, and the question naturally arises, "Why have they proved failures?" The reasons therefor are numerous, but can be summed up in a few words, namely, too much economy in the matter of insulation and carelessness in handling. The committee found in its investigations that in some cases there was insufficient insulation used, and in many others carelessness in laying the conduit or drawing in the cables and wires caused much of the trouble. It calls attention to the fact that it is absolutely necessary that all work and materials in connection with underground wires should be first class, and that it is poor economy to use any but the best. More intelligence should be used by the workmen in drawing the cables in and out of the ducts and working in the manholes. Much of the damage, the committee states, is done at these times.

ELECTRIC COOKING.—Cooking by electricity is becoming, as we prophesied, quite the fashion. We notice that the proprietor of the Eldon Dining Hall and the Pineapple Grill at Newcastle-on-Tyne has had trials of this novelty in cooking. At the former place on Friday some cutlets, and at the latter on Sunday a thick chop, were cooked by this new process—the cutlets in seven minutes and the chop in 14—to the entire satisfaction of the managers and chefs. We believe electric cookers are being fitted in several of the West End flats in London. They deserve to be widely adopted. Mr. Dowling's demonstrations at the Crystal Palace will greatly foster this cleanly and easy method of everyday cooking.—London Electrical Engineer.

ANOTHER ELECTRIC RAILROAD.—The preliminary survey for an electric railroad running through the center of Vaca Valley has just been completed. As laid out, it will be a little over ten miles in length, tapping a most productive territory. While it will be valuable for the transportation of passengers, the object is to provide means for transporting the great fruit product of the country traversed. It is estimated that the minimum traffic will exceed 15,000 tons of fruit per annum exclusive of ranch supplies. The cost is estimated at \$100,000. Vacaville parties have interested outside capitalists, and it is expected that 30 days will see the project under way.

A FLATIRON.—In the Brush Co.'s offices at Rochester, N. Y., can be seen a flatiron invented during the last few months, which is being tested for use in large laundries. The iron has a wire attached to the back for

heating it, and it is estimated that it can be brought to the necessary temperature in this way about 30 per cent quicker than the usual method. A soldering iron is also being tested for use, and there are many small machines with motors attached.

USEFUL INFORMATION.

THE BLACKSMITH.—The blacksmith occupied an important position among the craftsmen of the middle ages. The insecurity of life and property, which was one of the chief grievances of the times, made strength of material indispensable, whether to guard the shrine of a saint or to protect after a more homely fashion the family chest or coffer. The strength and durability of iron led to its use for these defensive purposes from early times. But the workman of the middle ages was not content to allow strength and ugliness of form to go together, but contrived to breathe a spirit of beauty into his designs without sacrificing the use to which the material was destined. Thus wrought iron formed the object of much artistic work both in England and abroad. Until coal came into general use, malleable iron was produced direct from the ore with charcoal fuel by continuous working. Sussex was from early times a chief seat of the iron industry. The earliest positive record of the trade there is contained in a grant made by King Henry III to the town of Lewes in 1266, by which the inhabitants were empowered to raise toll for the repair of the town walls after the battle. Every cartload of iron destined for sale which came from the neighboring "weald" was to pay one penny toll, and every horse-load of iron half that sum. In 1290 a sum of money was paid to a certain Master Henry, of Lewes, for the iron work to the monument of Henry III., in Westminster Abbey, which reminds us that talented smiths were brought often from long distances for important works.—Chambers' Journal.

TO KEEP IRON PIPES FROM RUSTING. A simple and economical way of tarring sheet iron pipes, to keep them from rusting, is as follows: The sections as made should be coated with a coal tar and then filled with light wood shavings, and the latter set on fire. It is declared that the effect of this treatment will be to render the iron practically proof against rust for an indefinite period, rendering future painting unnecessary. In proof of this assertion, the writer cites the example of a chimney of sheet iron erected in 1866, and which, through being treated as he describes, is as bright and sound to-day as when erected, though it has never had a brushful of paint applied to it since. It is suggested that by strongly heating the iron after the tar is laid on the outside, the latter is literally burned into the metal, closing the pores and rendering it rust proof in a far more complete manner than if the tar itself was first made hot and applied to cold iron, according to the usual practice. It is important, of course, that the iron should not be made too hot, or kept too hot for too long a time, lest the tar should be burned off. Hence the direction for the use of light shavings instead of any other means of heating.—Stone.

TRINIDAD ISLAND'S SUPPLY OF ASPHALT.—The Trinidad pitch-lake concession has been extended for an additional year on the original term of 21 years from Feb. 1, 1909, for every \$20,000 paid by the concessioners before Feb. 1, 1909, over and above the minimum sum of \$700,000 payable in the first 14 years, and the \$140,000 to be paid for the seven years' extension from Feb. 1, 1902. The Trinidad Asphalt Co. has also agreed that if by Feb. 1, 1892, it had not paid to the Colonial Government \$500,000, in addition to the \$50,000 permanent deposit in London, the company would give to the Crown a mortgage on all land it now possesses in Trinidad as collateral security for the balance then remaining of the \$700,000. The Governor of the Island complains that many persons are still illegally obtaining from government land or shipping from private land to which they have no title inferior asphalt, which injures the reputation of the Trinidad asphalt in New York, or it has to be purchased by the Barber Asphalt Company to prevent it being laid on American streets.—Paving.

FOR the intense actinic light required by photographers, Herr Putz of the Vienna Photographic Society uses aluminum instead of magnesium. The aluminum is mixed in powder with chlorate of potash, or is placed in thin leaves between sheets of collodion cotton impregnated with chlorate of potash. A brilliant, smokeless light is produced.



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SAN FRANCISCO:

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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Electric Lighter—Barr Electric Mfg Co., New York.
 Technical Books—Henry Carey Baird & Co., Phila.
 Delinquent Sale Notice—Keystone Con. Mining Co.

See Advertising Columns.

The Earthquake.

The earthquake which occurred in Central California on Tuesday morning was felt mainly in a district 35 miles long by 25 wide. Outside of that area, although the vibrations were felt, no damage was done. At Vacaville, Woodland, Winters and Dixon a number of brick buildings was injured and many brick chimneys thrown down. Another shock occurred on Thursday about 10 A. M., entailing some slight further damage to the buildings already injured.

The shock of Tuesday was in a general north and south direction. It was not violent, but was rather long-continued. The light brick walls common to country buildings were not strong enough in the towns named to withstand the vibrations, and more damage was done near the center of disturbance than has been the case with any shock since that of 1872. No persons were killed, and but few injured—none badly. The only building in this city which was damaged was the Old Academy of Sciences building, which was being repaired. The front wall, being improperly supported, fell.

The center of seismic disturbance was this time in Solano county. Before this, at the time of heavy earthquakes, the centers were in Inyo county, near Lone Pine, and at

Haywards, Alameda county. The damage this week was confined almost entirely to lightly constructed brick buildings and the chimneys in wooden structures, and all within the area mentioned.

A Department of Mining.

The bill introduced by Caminetti of California, creating a Department of Mines and Mining, has been favorably reported by the House Committee in Congress. It provides that there shall be an executive department of a general character, the duties of which shall be to acquire by examination and by practical and scientific experiments, geological researches, or otherwise, useful information on the subjects connected with mining in the general and comprehensive sense of the word, and to diffuse the same among the people of the United States. The Department shall be under the supervision of a Secretary of Mines and Mining appointed by the President. There shall be in the same Department an assistant secretary appointed by the President. The Secretary shall receive the same salary as is now paid to the Secretary of each of the executive departments, and the salary of the Assistant Secretary of Mines and Mining shall be the same as that paid the First Assistant Secretary of the Department of the Interior. The duties now imposed by all laws and parts of laws relating to mines and mining affairs exclusively, shall be performed by this Department. The Geological Survey and the Bureau of the Mint are to be transferred to this Department, and the sale of mineral lands of the United States shall be conducted under the auspices of this Department.

We have not seen the full text of this bill, but should be glad to see the various departments now exercising some jurisdiction over mining concentrated in one. The Mint Department, for instance, might turn over the collection of mining statistics, and the Geological Survey its Mineral Resource division to the new Department, or the Geological Survey itself be confined more to the mining field and take the whole division.

As it is now, the Mint collects the mining statistics of gold and silver and the Geological Survey collects those of other metals and minerals. Neither one provides funds enough to do the work properly, and the chiefs of the divisions are hampered and unable to accomplish what they should.

If the new Department were organized in such a way as to get experienced men, and not merely make political places, much good could be accomplished. The total mineral products of the United States in 1890 were worth \$652,099,218, yet as far as the Government is concerned it did not spend \$25,000 to find out how or where this money was made. The technology of the mining industry is entirely neglected. The Mint does a little and the Geological Survey a little, but neither as much as it should. The gentleman in charge of the Division of Mineral Resources of the Survey is competent and industrious, but he is not allowed money enough to do his work or employ assistants in the field. The Mint has more to do with coinage than with mines, and the work it accomplishes is insufficient and unsatisfactory.

It is to be hoped that even if Mr. Caminetti does not accomplish all he desires, in founding a new Department, he will at least call attention to the present unsatisfactory condition of affairs. But it is to be hoped his executive department will be created.

AMONG the items of the expenses of the Con. Cal. and Va. mine for March were: \$13,606.23 for supplies, \$32,606.23 for salaries and wages, \$25,719.50 for reduction of ores, and \$2485.15 for Comstock tunnel royalties.

CARSON, NEV., had a big "silver meeting" on Wednesday night of this week.

Battery and Car Samples.

We had a conversation this week with Thos. H. Leggett, president and manager of the Standard Cons. mine of Bodie, on the subject of car and battery sample assays, concerning which he had a letter in the PRESS of April 16th. The editorial comments on that letter Mr. Leggett takes exception to, inasmuch as they appear to connect him in some way with the practices in vogue at the Hale & Norcross mine on the Comstock. It was, however, not intended to convey the idea that he was doing as the Comstock men did. The object of citing the Hale & Norcross method was to show that the evasion of the law by the officers of that company, in relation to recording assay value of the ore, had worked to their profit and the detriment of the stockholders.

Mr. Leggett's point was that neither of the methods specified would give the proper information of the value of the ore, on account of the presence of the free gold. For silver mines it may be all very well, but not for gold. He says that he gives the information in the only proper way to give it in the case of a free gold ore. Over 60 per cent of the value of the ore from the Standard mine consists of free gold, while nearly 90 per cent of the entire product is obtained from the batteries and plates. Consequently a battery sample would not give the assay value, as an unknown quantity of free gold would remain inside the mortars.

Mr. Leggett claims that the only way to give the assay value of such ore as he is working is by adding together the value of the ballion product of the batteries and apron plates, the value of the concentrates from the Frue vanners and the value of the escaping tailings, the latter determined by daily assay. This sum, divided by the number of tons worked, in a month, gives the true assay value of the ore.

The manager contends that he is really complying with the law so as to give the exact information required in the best way, so he naturally objects to being classed with Comstock men who have been evading the law. A little free gold in a sample might bring the assays up high in some cases. That is to say, it would be impracticable to sample the free gold ore properly, without a special sampling plant devoted to that object. The physical conditions of the Standard ore are such as to prevent accurate sampling as long as the gold exists free as it does.

It would seem as if Mr. Leggett's point was well taken in the case of free gold ore. His method of getting the value covers the battery, plates, concentrates and tailings, as stated, which would seem better than a mere car sample or battery sample assay, for the reasons mentioned. It was not until Mr. Leggett took charge of the mine that this system was adopted and it certainly seems better than that previously in vogue.

Every millman knows that, in the case of free gold ores, the batteries hold a goodly proportion of the metal. A battery sample taken in the usual silver-milling way would therefore fall in assay value below the real value of the ore, just in proportion to the amount of gold caught in the battery.

LECTURES ON ZOOLOGY.—A course of popular lectures on zoology, illustrated with stereopticon views, will be given by the California Zoological Club under the auspices of the California Academy of Sciences at their hall, No. 819 Market St. The lectures will be given on Thursday evenings at 8 P. M. The series is as follows: 1. Creation by Law, April 21st. 2. Fundamental Groups of Animals, April 28th. 3. The Mammalia, May 5th. 4. The Mammals of California, May 12th. 5. The Bird, May 19th. 6. Song Birds of California, May 26th.

Stocks on Margin.

The decision this week, as to the illegality of the sale of mining stocks on margin, has come at rather a bad time for the stock market, but it has come none too soon. The system of dealing on margins is one of the greatest evils of the stock jobbing business, inasmuch as it enables those who cannot really afford to speculate, to engage in the business. Rich men with money to spare can afford such speculative transactions as are involved in the Pine-street markets; but men with small means almost invariably come to grief.

How many thousand people have become impoverished by this system, it is impossible to tell. But almost every San Francisco man can speak of some experience of his own or of his neighbor. Men put up every cent they can rake and scrape to cover these margins and the smallest kind of a reverse of the market "puts them in a hole," from which only more money will relieve them.

It is under such circumstances that men have, in their eagerness to save themselves, committed dishonest acts which eventually led to ruin. They have sacrificed families and friends, lost standing and respect, and become bankrupt. Keeping a margin good on a falling market is harder work than paying off a mortgage, because there is mighty little time to do it in. The evils of the system were long since recognized; but if it were stopped, and stocks bought only for cash, there would be comparatively little business for the brokers. They naturally therefore object to the decision just rendered, and will take the case to the Supreme Court.

The decision was for the plaintiff in the case of W. N. Wetmore against E. P. and Mary A. Barrett to recover, as he claimed, \$3380 for moneys had and received by them for his benefit. This they denied, but affirmed that they paid out at his request \$3380. The fact is the money was lost in mining stock speculations, and the opinion dealt at some length with the testimony in the case to show the character of the various transactions which passed between them.

Wetmore claimed to be entitled to recover the whole sum deposited with the Barretts, because the transaction is illegal and in violation of Section 26, Article IV, of the Constitution, prohibiting the purchase of shares of mining stock on margin.

The celebrated case of Cashman vs. Root, in which the Supreme Court first dealt with this point, was applied, but the defendants' counsel claimed that it had no bearing, because this action is for money paid as part of the purchase price of stock actually purchased for Wetmore as ordered by him. He had determined what stocks he wanted, and ordered them bought, borrowing the balance of the purchase price from the Barretts. Judge Levy's conclusions are as follows:

Plaintiff's dealings with Barrett were altogether on margin. When the value of the stock purchased did not amount to the sum paid, plaintiff was required to put up other stock as security or cash to keep the margin good. As the market fluctuated on purchasing stock, the cost price was charged to plaintiff less the amount of margin put up in cash. When sold, his account was credited with the amount realized. He was, of course, charged with the broker's commissions and the interest on the money advanced. Such were the facts in the case of Cashman vs. Root, and such are the facts in this case.

After careful consideration of the Cashman-Root case, taken in connection with Section 26, Article IV, of the State Constitution, I am clearly of the opinion that buying and selling of the shares of the capital stock of corporations in any stock board, stock exchange or stock market is void in this State, except the stock is delivered to the purchaser or paid for in full. The sale of any stock wherein the broker holds the certificate as collateral security for the balance of the unpaid purchase price, and has the option of selling when the stock depreciates, or holds it subject to the rise and fall of the market, is a contract void in this State.

BEHREND JOOST of the San Francisco and San Mateo Electric Railway states that the road will be open for traffic on Tuesday next, and that on Monday there will be a trial trip for the benefit of invited guests.

Vein Phenomena.

Mr. John B. Farish observed, during an examination of the Golden Age mine, Boulder, Colo., some interesting vein phenomena, which he described to the American Institute of Mining Engineers some time since. The relative location of the Golden Age and the Sentinel mines are shown in Fig. 1 of the cuts.

The Golden Age location covers the outcrop of a quartz-porphry dyke, which cuts through the granite country-rock with a strike of about N. 70° E. This dyke varies in width from a few feet, as at a point be-

the incline below the apex. The adit which cuts the porphyry dyke about 250 feet below the bottom of the shaft, shows this streak in the same contact.

Beyond the split, the lower or foot-wall streak stands a little steeper; and at the second level, 180 feet below the surface, it is found in the contact between the under side of the porphyry dyke and the granite foot-wall. It remains approximately in this contact, though occasionally found wholly in the granite, to the lowest explorations in the shaft.

The porphyry dyke varies in width on its dip as well as on its strike. On the third

seams and feeders that have enriched both veins come in from the porphyry dyke.

The ore from the Golden Age veins is somewhat remarkable, and the rich and magnificent gold specimens obtained from them are familiar to all the miners of Boulder county. It is a typical free-milling gold ore. A good percentage is saved by simple amalgamation on copperplates, the resulting bullion running over 900 fine; the tailings yield pyritic concentrates of fair grade. As a rule, the vein rock, especially when rich, is a hard, often flinty or vitreous, white quartz. The gold, especially in the hanging-wall vein, is seldom accompanied

chalcopryite; but the gold in the ore remains as free as elsewhere. In none of the openings were any tellurium minerals found by me; and Mr. Amsden says they are unknown in the Golden Age.

Returning to the surface, the Sentinel location covers the apex of a vein which appears on the surface enclosed in a belt of schistose or gneissic rock. It lies nearly parallel to, and about 100 feet south of the apex of the Golden Age vein. Only two shallow openings have been made on this vein on the surface; the deeper being a shaft sunk about 30 feet. In driving the adit, the first vein encountered was the Golden Age, on the hanging-wall contact of the dyke, and about 175 feet farther north, the Sentinel vein was reached in granite. An upraise was made on this vein to the lowest (No. 5) level from the main shaft, demonstrating that this vein dips south about 70°, and passes through the Golden Age vein on its course.

The Sentinel produces an ore entirely distinct from that of the Golden Age. It is the familiar bluish quartz of the tellurium veins of Boulder county, with the characteristic chalcopyrite, quartz crystals and finely disseminated pyrites. The value is in metallic gold, petzite and sylvanite. While most of the metallic gold was deposited as native gold, a certain portion has evidently been rendered free by the partial decomposition of the tellurium minerals. Some of this ore is very rich. One specimen found, weighing a little over two pounds, is valued at \$228.00.

The richest ore usually occurs in two narrow seams or streaks, often only a foot, but at times as much as 10 feet apart; the intervening space is more or less mineralized country-rock. The miners working as lessees on this vein, consider it richest in the schistose rock, and poorest when it is in the porphyry, on its course through the dyke. Though the openings on the vein, in the dyke, are limited, this opinion appears to be correct.

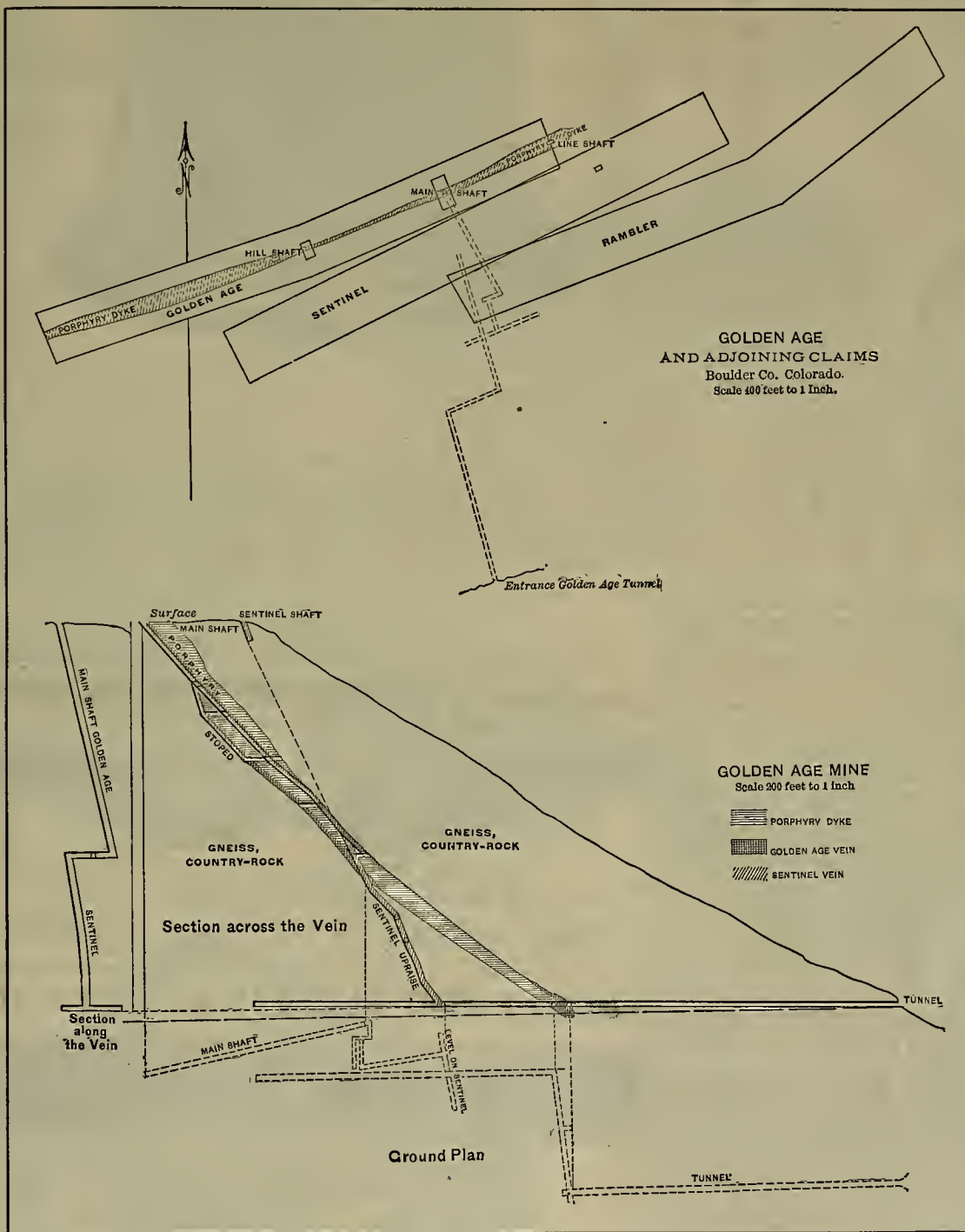
So distinct are the characteristics of these veins, that the crossing of the Sentinel through the Golden Age is plainly marked, being exposed in the main shaft and workings connected with it.

It is possible that the facts observed here confirm the opinion that the gold mines of Boulder county belong to at least two distinct periods of vein formation. To the first and earlier may be assigned the Golden Age, and the mines of Ward and other districts producing similar gold ores, free from tellurium minerals; to the second and later, the tellurium gold veins for which Boulder county is particularly noted.

That the ores from the Sentinel, or tellurium-vein, are of lower grade where the vein passes through the porphyry dyke than elsewhere, may be due to the formation of the Golden Age vein first.

This vein probably drained the dyke of much of its disseminated mineral values. Prospectors, as a rule, look for riches in larger veins of ore where veins unite or crosscut each other. In this property we have two interesting occurrences of this kind. The Golden Age veins unite at a point 100 feet down. These are similar veins of the same age. The result was larger and richer ore bodies near the junction. In the other case, the crossing of the Sentinel tellurium veins through the Golden Age veins, which was the passing of a later through earlier veins, produced no local enlargement or enrichment of the ore bodies. It may be inferred with probability as a general rule, subject of course, to local exceptions, that for the production, by the junction of two veins, of ore bodies larger or richer than are characteristic of either vein separately, the two veins should be of contemporaneous origin.

THE finding of a very large gold nugget is reported at the Planchas placers, Sonora, Mexico.



ORE BODIES AT THE JUNCTION OF CROSSING VEINS.

tween the main shaft and the Hill shaft, to about 50 feet, and dips about 45°, as shown in Fig. 2. The outcrop of the main ore-chute thus far explored on the Golden Age vein is marked by a line of surface works, extending along the contact on the lower side of the porphyry dyke, from the Line shaft on the east to the main shaft on the west. At the depth of about 100 feet the main shaft discloses a split in the vein. The upper or hanging-wall streak continues into the dyke on approximately the same dip, but with porphyry hanging and foot-walls, until a depth of 370 feet is reached, where it enters the upper contact, between the porphyry and granite, and remains in it to the bottom of the main shaft, 470 feet on

level a crosscut 47 feet long reaches the granite on both sides of the dyke, while in the adit the porphyry is passed through in 8 feet. It has been considerably acted upon by the vein-forming agencies in the upper workings; and in none of these openings was I able to secure a specimen that was not more or less decomposed. Where it is cut by the adit it is less acted upon, and shows considerable amounts of pyrites.

The Golden Age veins are well defined, often presenting a banded structure. They are inclosed in distinct walls, with selvages, which at times exhibit slickensides. So far as my observation went—and this was confirmed by Mr. Amsden, who has been foreman on the mine for ten years—the

by pyrite, chalcopryite, or any of the baser minerals. It is generally imbedded in the white quartz as bright yellow gold, ranging in size from coarse grains to nuggets, occasionally several ounces in weight.

One specimen, found by a former owner, contained 70 ounces of gold, nearly all in one piece. The footwall vein contains more of the base minerals than that of the hanging-wall. After it reaches the lower contact between the porphyry and granite, there is a marked increase in the quantity of these associated minerals, and this is still further increased when the vein leaves the contact and enters the granite. In such places, blende and galena appear in small quantities, with pyrite and considerable

The Gold Ores of Shasta County.

REDDING, SHASTA CO., April 16, 1892.

TO THE EDITOR:—I attended the first regular meeting of the Miners' Association of Shasta Co., held at Redding on the 2d inst. I was surprised and pleased to note the keen and intelligent proposals of the miners present to combine their united efforts in overcoming the enormous difficulties in the way of investing the smallest amount of money in mining and how to reap the largest reward. I find a grade of ore here of surprising richness and capable of large dividends if rightly handled.

A radical departure in mining here has been inaugurated by a company of practical men from Colorado, whose success has been surprising to most old-school miners of this State. While the principle of working mines in Colorado is different from California to a certain extent, it is one that in this county can be an exact duplicate.

Scientific and practical knowledge applied in our observation here shows that high grade ore of from \$200 to \$10,000 per ton has been milled here by the free-milling process and but a small part of the value extracted. The system employed by these Colorado men is one of simplicity and small expense; the hand-sorting of the ore and the shipment to the smelter, anything running less than \$40 consigned to the dump.

To the success of this system is necessary the application of the assayer's implements and knowledge, which I find is rather scarce. A fair knowledge of the ore's value determined, the shipping question is simple. Next comes the treatment of second-class ores, as in Colorado, by any process cheap and practical. Milling has been an almost absolute failure; concentration is attempted, and in some ores quite successful, but in the main, failure to extract a reasonable percentage is universal.

The application of the cyanide process is yet in its infancy and is watched intently; repeated trials of new appliances and new processes having failed, but small encouragement is given to any new departure until proven and adopted by some leading company. Investigating the failures of milling, and the present large losses from mills, I am face to face with a new combination of gold, or a wrong impression, which prevails. Before me is a piece of pure milky white quartz, without a stain and showing not a trace of mineral, yet assaying in gold up in the hundreds. Crushed dry, the values disappear in water. The gold passes into solution; long intervals of settling the water, final filtration and evaporation of the liquid showing large values. What form is this gold in, seems to puzzle Shasta county, and it is stated here that the ore in question has been submitted to Wm. Ireland, State Mineralogist, but has never been solved and no explanation has been offered by the learned gentleman.

The combination seems quite universal, which, to a certain point, explains the large losses. Is this a soluble chloride of gold or not? Is not the loss due to improper treatment of the slimes? Is not the loss a mechanical one and capable of being reduced by a more intelligent treatment of the slimes? "BOSTON."

SAFETY SIGNALS FOR MINE SHAFTS.—

A mining contemporary gives an account of an electrical apparatus designed for the prevention of accidents to miners while riding on the cages in the shaft, and which will also, it is said, tend to lessen the number of accidents occasioned by cages coming in contact with the chairs. The invention has been in successful operation during the past two years at the Drum Lummon mine, Montana, and it was devised by an ingenious employe of the company owning the mine. The arrangement consists of an electrical connection between the cage and the chairs on the different levels of the mine, and also between the cage and the engine room. An ordinary battery is placed in the bottom of the cage, and wire attached to it run through a contact piece to the side of the shaft, something on the same principle as the trolley on an electric street car. An ordinary push-button is placed in such a position on the cage that the station tender can readily reach it. Wires running down the shaft connect with the trolley on the cage, and at the other end are attached to a dial in the engine room. Another wire connects with the chair in the mine, and as the dial is in full view of the engineer, he can tell at a glance whether the chairs are set or not. Should an accident happen to anyone on the cage between two levels, by pressing the push-button the cage can be brought to a stop in a moment. In the ordinary way, with a hell-rope attachment, if the cage is going at even a low speed it is dangerous

to attempt to grasp the bell line, on account of the liability of getting an arm caught between the sets.—Colliery Engineer.

Workmen and Their Tools.

"Bad workmen," we are told, "always find fault with their tools." We might extend the significance of the axiom by stating that bad workmen make bad tools. We may satisfy ourselves as to its truth by a cursory inspection of the kit carried by a poor mechanic. In the machine shop we shall find our saying conspicuously exemplified. A glance at the condition of the tools, to say nothing of the surroundings, will tell us whether good artisans or second-rate workmen are employed, whether the shop turns out good or indifferent work.

The make of the tools has little to do with the settlement of the question. The finest machine tools ever designed may be ruined by ill-usage, and, in fact, as a general rule, the more perfect the machine the more susceptible it will prove to gross ill treatment. Moreover, a shop full of good tools ruined by ill-usage or neglect is a much sorer spectacle, to the experienced mechanic particularly, than an aggregation of second quality implements in a similar condition, and, as a general rule, a poor tool spoiled will do as good a job as the most expensive machine that has undergone maltreatment.

The appearance of the tool will betray the hand of the workman, no matter how badly worn. Fair hard wear is altogether different in its effects from willful misuse or the neglect that is born of ignorance. A man may wear a tool out, and it will still have an altogether different look to the one that has been deliberately or carelessly ruined.

It is a waste of good money, of good material and of the designer's abilities, to place in the hands of an ignorant or reckless workman a first-class machine. He would accomplish about the same result with the cheapest in the market, and feel just as well satisfied. A competent workman, on the other hand, will show his appreciation of a superior tool, both in the care he will take of it and the work he will make it accomplish. You would not find a good man, for instance, risking the ruin of a machine by forcing it to do work it was never intended for, because the tool he needed was temporarily unavailable, nor would it occur to him to overload or strain a machine. The man who uses his hammer to loosen a bolt because his wrench is not handy, or who makes a hammer of his wrench because the proper tool is not in its place, is an unprofitable servant, and will eventually prove a source of loss; and the man who will spend half an hour in fixing up a drill or cutter to suit his work, spoiling it for all future use, rather than devote a few minutes to a search for the exact article he requires, will never earn a mill for his employer.

It does not pay to fit up a shop with poor machinery if you want good work, nor do you want to put bad workmen in charge of your expensive tools. You are doing things by halves, introducing a hull into your china shop, and playing with fire in a manner that is certain to result in burned fingers. Good machines will never do good work in the hands of poor mechanics, and although a good workman will often do wonders with the poorest of tools the combination is not economical, and is usually unsatisfactory to employer and employed. Good tools operated by competent mechanics last longest, do the best work, produce in every way the most satisfactory results, and are always cheapest in the long run.—Safety Valve.

OIL FUEL IN GLASS FACTORIES.—Quite a number of the large glass factories are using Lima oil, at a saving of over 25 per cent on the present prices of fuel gas, based on a price of 67½ cents a barrel for oil delivered. By the new process the oil is transformed into gas, and then mixed with air on its introduction into the furnace. Among the glass factories now using oil as fuel are the following, according to the *American Manufacturer*: West Penn Glass Works, Blairsville, Pa.; Greensburg Glass Works, Greensburg; Agnew Glass Works, Hulton; Brownsville Glass Works, Kensington; Eagle Glass Works, Leasurville; Riversburg Glass Works, Wellsville, Ohio; North Wheeling Glass Works, Wheeling; Rodefer Glass Works, Bellaire, Ohio; Kerns and Gossick Works, Zanesville, Ohio; Penn Plato Glass Works, Irwin, Pa.

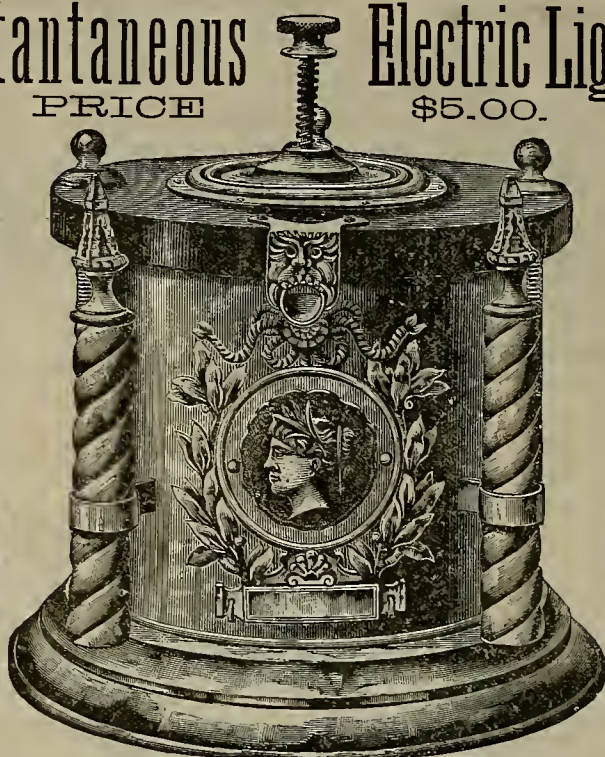
ARTICLES of incorporations have been filed in the County Recorder's Office at Phoenix, Ariz., for the Maricopa Gold and Silver Extraction Company, with a capital stock of \$300,000. The incorporators are all Denver capitalists and propose to transact a general mining business, operating by the new MacArthur-Forest cyanide process.

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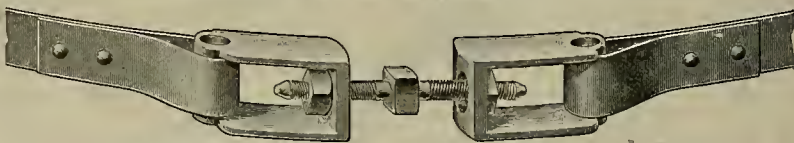
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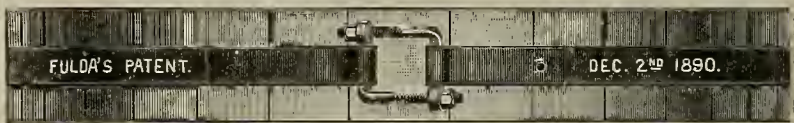


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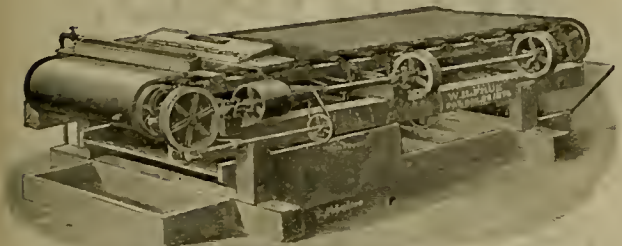
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CLADSTONE MINING COMPANY, C. J. Clark, M. E. Gen'l Supt. FRENCH OULCH, Cal versus Co., Cal., Dec. 12, 1891.

MESSERS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIR: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have no less commendative statements against them with other widely published concentrates and have always found the Frue in first place. When I built this mill (20 stamp), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for TWELVE MONTHS. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and I do better work than the four-foot tables. They require no more attention than a four-foot table and handle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing, I will state that the ore has varied monthly from \$5 to \$20 per ton and this table has run from nothing to 60 tons per ton. I will conclude by saying that I cannot endorse the six-foot Frue Vanner too highly, and it is the only table that I would have in my mill.

C. J. CLARK, Gen'l Supt.

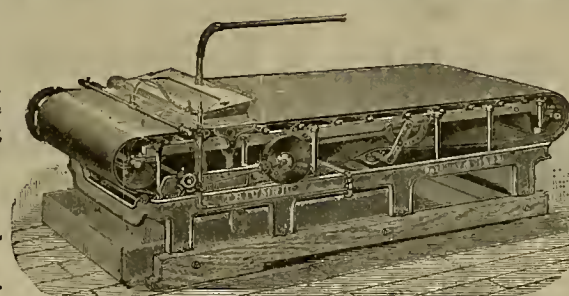
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Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sanson, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1888.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.

Signed] DAVID McKAY, Jr.,
Supt. North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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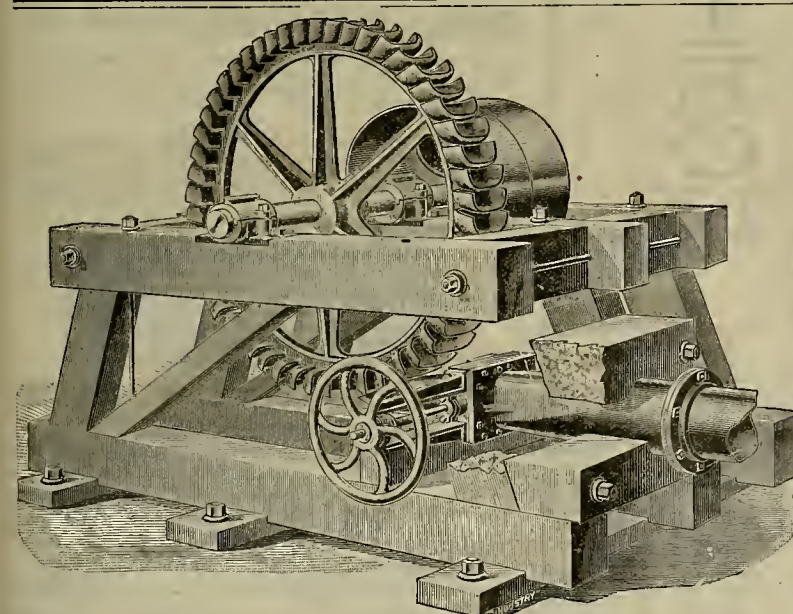
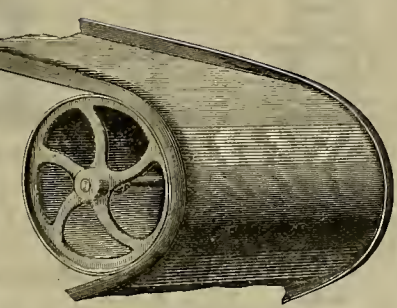
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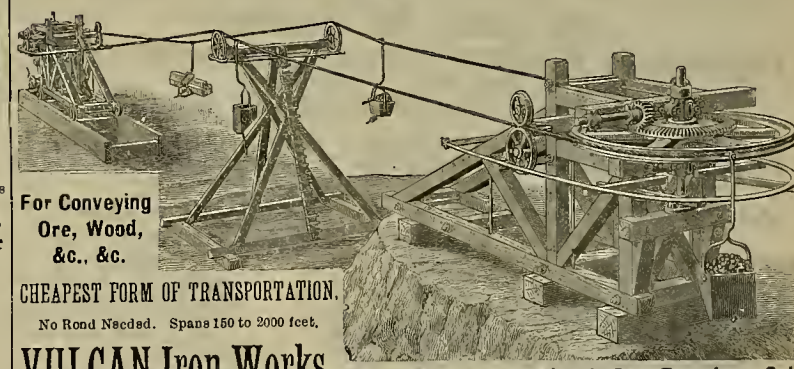
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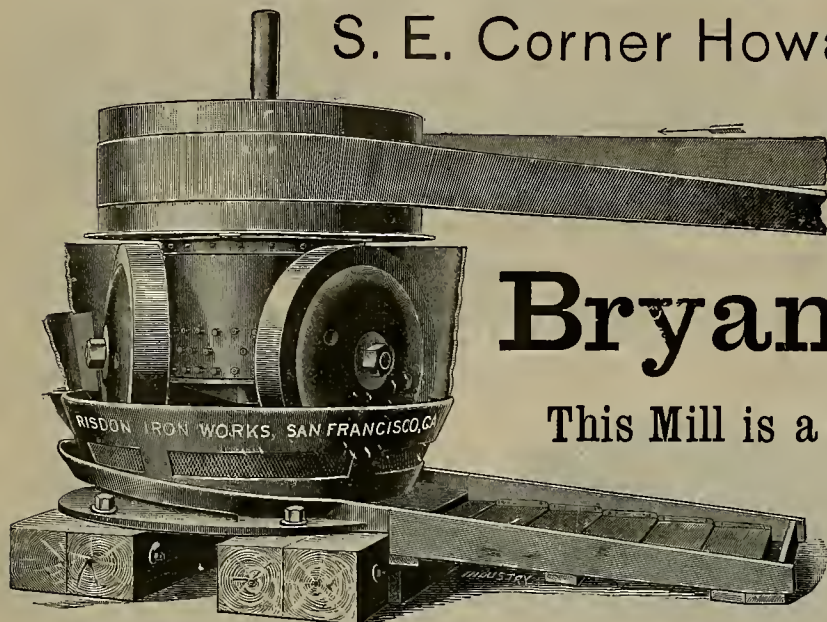
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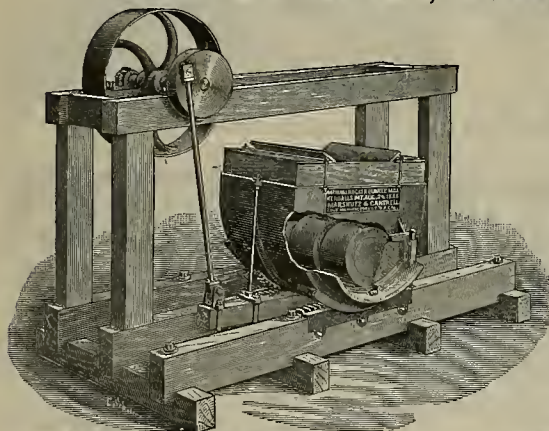
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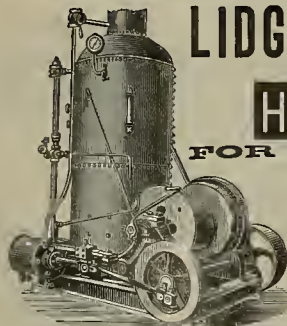
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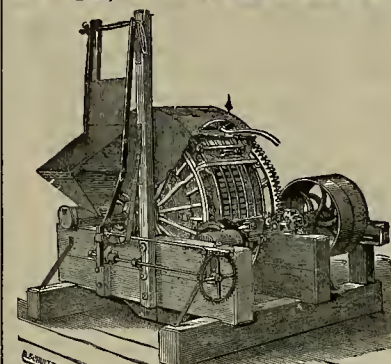
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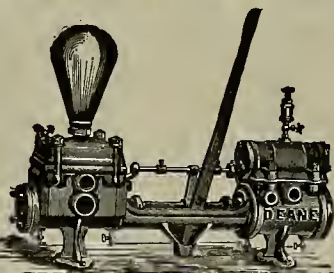
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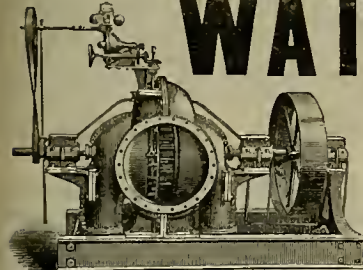
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Notice is hereby given that at a meeting of the Board of Directors, held on the 8th day of April, 1892, an assessment (No. 10) of Twenty-five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 300 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 8th day of May, 1892, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 31st day of May, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DUBROW, Secretary.
Office—Room No. 69 Nevada Block, No. 300 Montgomery St., San Francisco, California.

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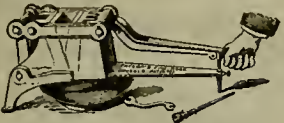
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Location of principal place of business, San Francisco, California. Location of Works, Amador City, Amador county, California.

Notice—The e are delinquent upon the following described stock, on account of Assessment (No. 2) levied on the 9th day of March, 1892, the several amounts set opposite the names of the respective shareholders, as follows:

NAMES.	No. Cert.	Shares.	Amt.
A. B. McCreary	8	2,334	\$5,835 00
A. B. McCreary	50	134	335 00
A. B. McCreary	57	533	1,332 50
A. B. McCreary	59	99	247 50
A. B. McCreary	114	100	250 00
John Clement	103	134	335 00
M. J. McDonald	129	200	500 00
M. J. McDonald	137	500	1,250 00
E. D. Rue, Trustee	138	925	2,312 50
Wm. Letts Oliver	133	40	100 00

And in accordance with law, and an order of the Board of Directors, made on the 8th day of March, 1892, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, No. 310 Pine St., room 43, San Francisco, California on MONDAY, the 9th day of May, 1892, at the hour of 12 o'clock M. of said day, to pay said Delinquent Assessment thereon, together with costs of advertising and expenses of sale.

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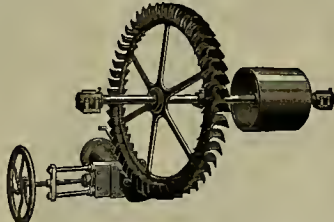
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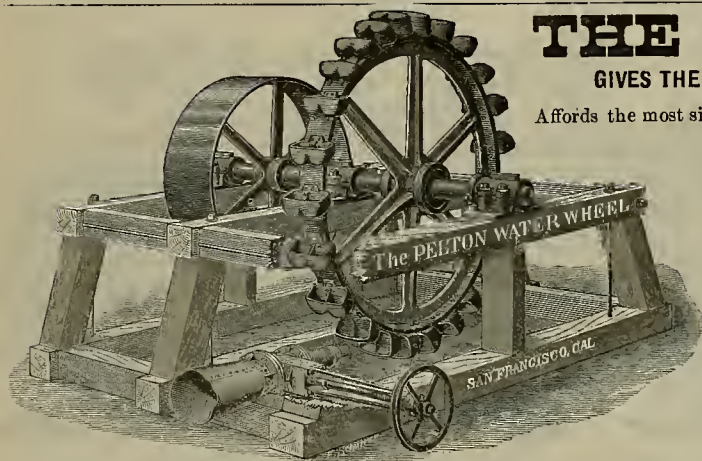
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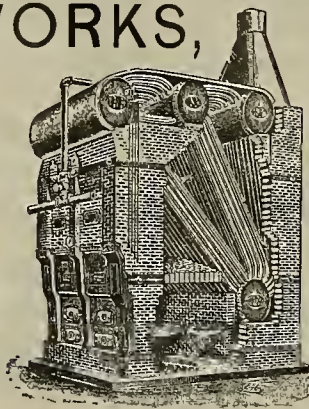
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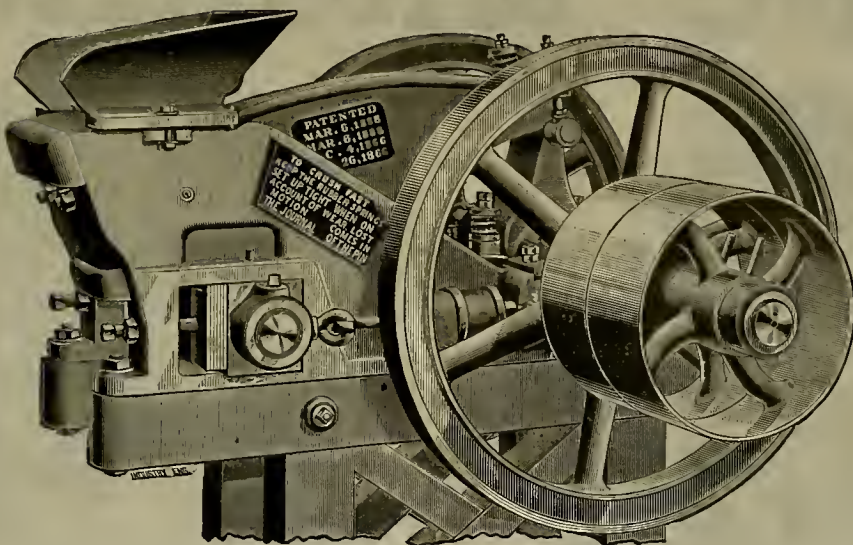
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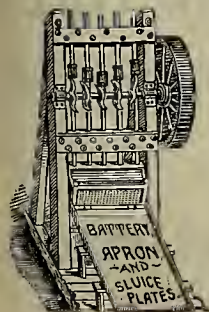
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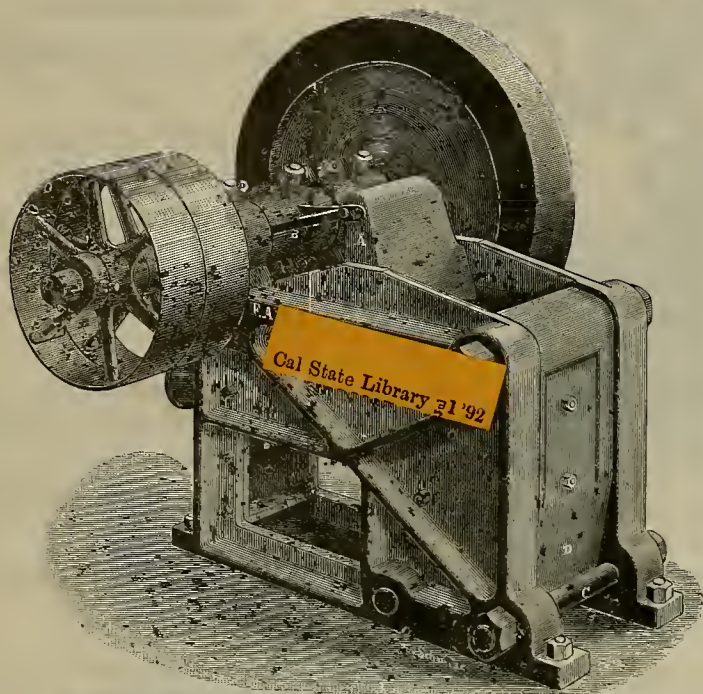


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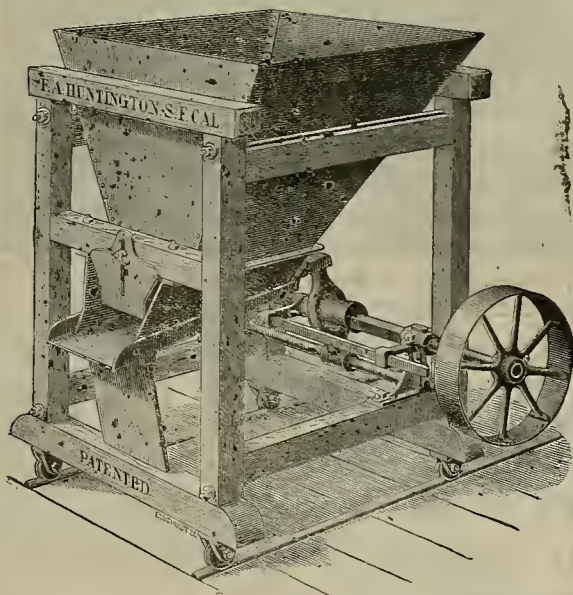
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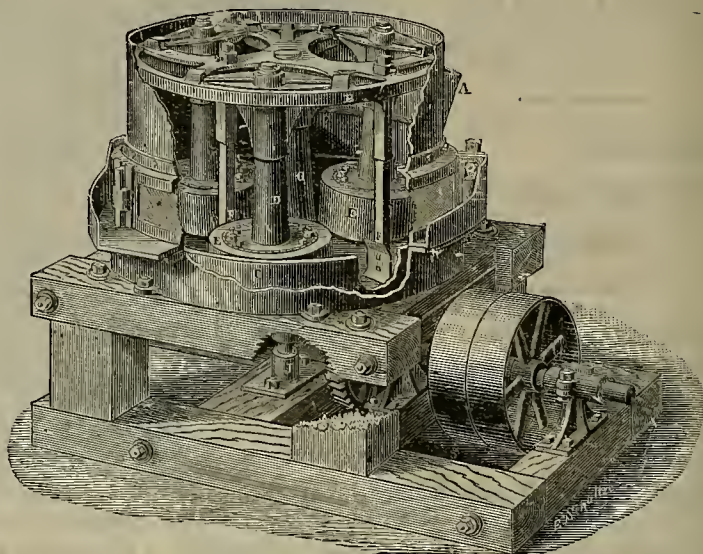
The Main Features of this Machine are Strength, Ease of Adjustment, and Simplicity of Construction.

The movable jaw A is worked by the eccentric B and is pivoted at the bottom. The stationary jaw D is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt C. The main wear is, of course, at the bottom of a breaker of this form, and the wear is easily taken up by inserting a plate between the bolt C and the jaw D. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



HUNTINGTON'S PATENT ORE FEEDER.

This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.

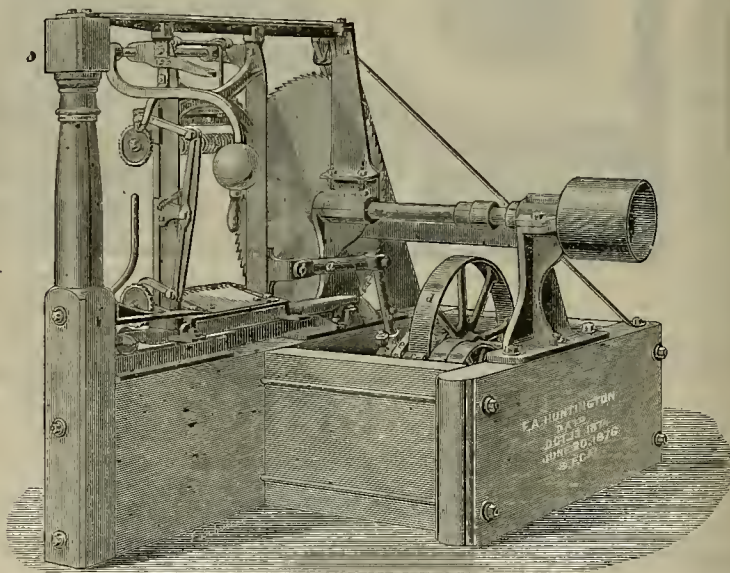
The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet-crushing and gold saving it has no equal.

I CLAIM ESPECIAL MERIT IN THAT FEATURE OF THIS SYSTEM WHICH PREVENTS ALL FLOWING OF GOLD AND QUICKSILVER, and the consequent loss of gold that attends stamp-milling.

For the economical working of ore that contains sulphurets, I particularly claim the adaption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.



F. A. HUNTINGTON'S PATENT SHINGLE MACHINE.

This machine is so well and favorably known by all the principal lumbermen on the Pacific Coast that it is useless to go into any detailed account of its merits; suffice it to say that recent improvements in a new, quick return feed-works has placed it far ahead of all competitors. Send for Circulars.

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VOL. LXIV.—Number 18.
NEWY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, APRIL 30, 1892.

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SINGLE COPIES, 10 CENTS.

The Gates Combination Crusher and Pulverizer.

The accompanying cut represents a combination crusher and pulverizer recently perfected by the Gates Iron Works of Chicago. The principle is the same as that of their regular form of crusher so well known over the country. There has been added, however, a movable or reciprocating concave, which allows the vibrating crushing cone to come in close contact with it, causing all the material to be crushed very fine before being discharged. The reciprocating portion of the concave is made in a solid ring, smaller than the inside diameter of the shell or outside casing. This is done to allow the concave to yield slightly to the motion of the crushing cone or head, the necessary resistance to crush the material as the head vibrates, being afforded by eight powerful springs which project through the outside casing or shell and meet the movable concaves, forming a resistance or backing of many tons. This resistance can be increased or diminished by setting up the screws which compress the springs, and which is done from the outside.

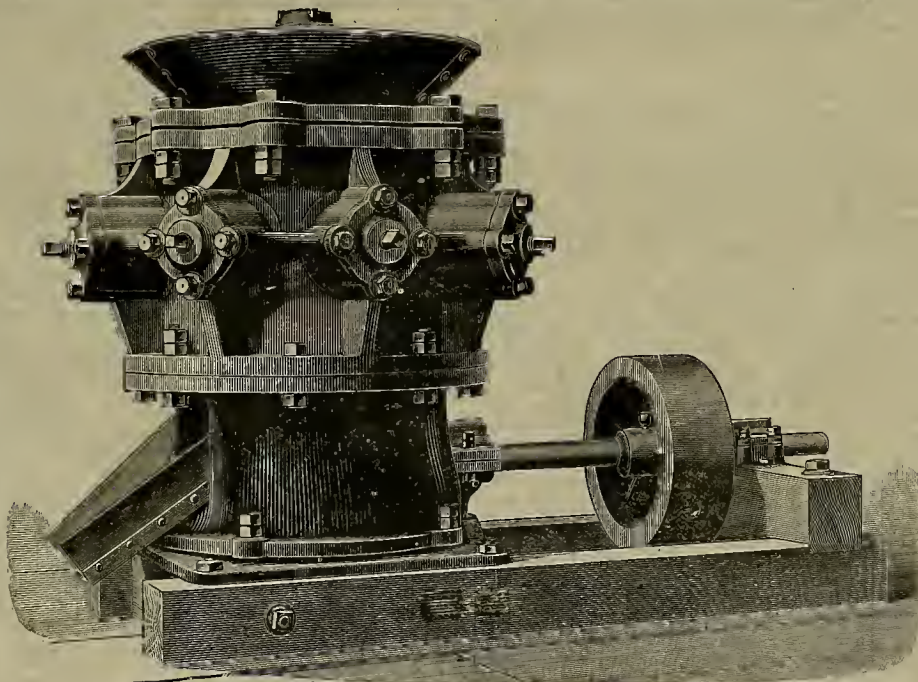
This machine has three feed openings, and will receive three pieces of ore 6 x 10 inches, reducing the material so that the largest piece will pass a half-inch hole. Twenty-five per cent of this product will pass a 30 mesh screen provided for the purpose, while the coarse or remaining 75 per cent passes over the screen and drops into an elevator, which carries it up and shoots it back into the crusher along with the large material which is being constantly fed into the machine, the result being that this fine material is again subjected to the crushing process, to be sifted out and the operation repeated so long as the machine runs and is supplied with new material.

By this means the entire product of any ore can be pulverized fine enough to pass through a 30 mesh screen which in some cases is fine enough for concentration. Where a finer product is required, it can be obtained by rolls or some other pulverizing machinery at comparatively small cost. This machine is no experiment, its utility having been demonstrated in practical working in many instances. The new mill of the Bunker Hill & Sullivan Co., in Idaho, is equipped with several of these crushers and they indorse them most highly. Several mills are also adopting them in Colorado and Montana.

This is believed to be one of the most important improvements yet made in the line of crushing machinery adapted to and greatly facilitating the reduction of all classes of ores. This machine weighs 12,000 lbs., with screen, elevator and frame, 15,000 lbs., and its capacity is, through 30

mesh screen, 18 to 20 tons per 24 hours; through 20 mesh screen, 25 to 30 tons per 24 hours; through 10 mesh screen, 35 to 40 tons per 24 hours. The Pelton Water Wheel Co., of this city, are the general agents of the Gates Iron Works, from whom full information can be obtained.

CHARLES ELLIOTT, Superintendent of the Spring Valley Water Works of this city, died suddenly at his home on Wednesday afternoon. Mr. Elliott has been actively identified with the Spring Valley Company as its engineer and superintendent since its organization, and before that was engineer of the old San Francisco Water Company. He is said to have been the first person to learn the machinist's trade in this city, beginning work at the Pacific Iron Works. In 1850 he was engaged erecting quartz



THE GATES COMBINATION CRUSHER AND PULVERIZER FOR ORES.

mills in Butte county. In 1859 he came back here, and has been connected with the water companies ever since. He was one of the oldest members of the Mechanics Institute, and for some years a member of the Board of Directors. Mr. Elliott was a popular man and had a very large circle of friends.

SAPPHIRES AND RUBIES.—Spratt Bros.'s sapphire ground near Helena, Mont., has been sold to the Sapphire and Ruby Company of Montana, an English company, for \$2,000,000. The land sold embraces 8000 acres on both sides of the Missouri river, reaching nearly fifteen miles along its banks. In addition the company has secured all water rights in the districts.

CONNECTIONS were made in this city this week with the shore end of the new submarine cable of the Pacific Telephone and Telegraph Company, which was lately laid to Goat Island and from there to Oakland.

A New Mill for Mexico.

A fine, first-class 30-stamp mill is being erected in the San Luis mine at Guanacevi, Durango, Mexico, for the owners, J. B. Haggin and others of this city. A wire-rope tramway over a mile long will convey the ore from mine to mill. White-Howell furnaces are to be used in connection with the mill.

This is an old mine formerly owned by English people. The ore carries silver and gold and some of it is very rich, running as high as \$1,000 per ton. There is at this time enough ore out to keep the mill running two years, and it will average from \$50 to \$70 per ton.

In order to take this new machinery to the mine a road costing some \$30,000 had to be built. From the railroad station at Jemenez

Treatment of Tailings.

The Standard mill at Bodie produces an abnormal quantity of slimes on account of the large amount of clay accompanying the quartz on the ledges. In the mill, for the treatment of tailings, are six pans and three settlers, fitted up for the Boss continuous system, and one pointed settler-box. The pan capacity was found to be too limited, and two pans were added to the line, and another settling-box put on to take the overflow from the first, in which too much material escaped. There is still found to be some loss in slimes, in the overflow from the second box, but this it is impossible to avoid and retain the proper consistency of pulp in the pans.

From test runs it has been ascertained that basing the bullion by the use of salt and bluestone on quality, does not increase the extraction, and the proper slight amount of chemicals necessary was determined; the tests also showing that much grinding in the pans was to be avoided.

Since these tests they have steadily improved the work on the tailings, obtaining a product of \$1.90 per ton treated in October; \$1.50 in November; \$2.24 in December and \$2.26 in January, being an extraction of 35 per cent at an average cost for the months named, of 88 cents per ton.

The average of several chlorination tests on the raw tailings shows but 8 per cent higher extraction than the continuous pan system.

Manager Thomas H. Leggett states in his report, that most probably, roasting with sulphur and salt by either the Plattner or harrel process, would give a much higher percentage of extraction, but with wood, at Bodie, costing \$10 per cord, laborers wages, \$3.50 per day, and freight rates three and four cents per pound

(the latter necessary to take into consideration on account of the chemicals essential for either process) it would be impossible to figure a profit on tailings of \$7.50 per ton.

Mr. Leggett sent a large sample lot of tailings to the Denver Gold and Silver Extraction Co. (MacArthur-Forrest or cyanide process) for trial, in the hope of obtaining a method giving a higher extraction without roasting or other great expense. The cyanide process results, after 12 hours agitation in a one-half per cent solution, were but 46 per cent extraction. This is but 12 per cent better than the present cheap pan process; a margin that would be more than swallowed up by the cost of the process and the expense of the reagent.

On 100 pounds of concentrates sent, worth \$86 per ton, their test of 12 hours agitation in a one per cent solution, gave 88 per cent extraction, or nine per cent in excess of that obtained by pan amalgamation, which would scarcely cover the cost of the cyanide.

THE Ocopah volcanoes in Lower California, are said to be again in eruption. This report confirms the previous accounts from the Lower California volcano region, that whenever heavy earthquakes occurred on the Pacific Coast these volcanoes became disturbed and their activity greatly increased.

EDWIN P. MARCELLUS, Secretary of the Pioneer Association of California, died suddenly this week. Like most pioneers, he was at one time engaged in mining, but of late years has resided in San Francisco. He was for some years United States Marshal here.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Ed.

Lixiviation of Gold Ores.

The MacArthur-Forrest Process.

SAN FRANCISCO, April 20, 1892.

TO THE EDITOR:—I have just returned from Calumet, in Shasta County, where I went on the kind invitation of my friend, Mr. Almarin B. Paul, to study the practical details of the MacArthur-Forrest process.

After having waited several weeks for the weather to become settled, I unfortunately arrived at the works at the moment when the heaviest storm of the season was impending. I found Mr. Paul a very busy gentleman, yet finding time for kind and courteous attentions to me, albeit somewhat annoyed by the unexpected turn of events in the weather department, which prevented bringing ore to his mill and otherwise interfered with his pursuit of happiness.

The battery was in operation only a few hours during my visit, but some of the percolators, or lixiviating vats, were full, and the pactolean stream was flowing steadily to deposit its precious burden, under the soft persuasion of chemical affinity, and return for another load. In this part of the process there is no noise, no hurry, no chance for the precious particles to slip away and go mocking down into the river bed; securely trapped and under absolute control, resist as they may, it is only a question of time when they must yield to fate and, with the brand of the American eagle upon them, become the slaves of the world's tyrant, man.

Australia, once the land of the convict slave, has taught free America to vote—beneficent irony of fate—also to skim the waters in the fragile "shell." It is not quite certain that the Cornstalk cannot give the American points in the noble art of self-defense. The New Zealander, not Macaulay's, has made the first triumphant advance in the practical solution of the land question—Auckland has partially adopted the "single tax," and the Premier reports the most encouraging results—and at last the Briton, after many failures, has given us a really good process for the extraction of precious metals from our ores, and, as a born Briton, I rejoice therein.

Yet, "America leads the world," if not always in invention, at least in the facility with which she assimilates a good thing, from whatever source it may come, and the energy with which she goes to work to develop all of its possibilities. The American naturalizes the Australian ballot, the Australian pugilist, the gum tree, the ladybird. He frankly adopts the English sparrow, and as frankly damns him afterward; and yet the poor sparrow is only doing what the English pilgrims did—driving out the natives.

In the matter of the land question, he will do as my friend Wilson, a typical American, did in Honduras when we had to cross a raging torrent. He just let all the rest of us get variously wet, from boot top to waist, and then, having made his notes of the course, mounted with his feet on the saddle and quietly rode through dryshod.

All imported benefits, including Irishmen, grow so much bigger and better on American soil that they soon become American, and I expect it will be so with the MacArthur-Forrest process.

Almarin B. Paul is a typical American, hence nothing if not progressive. He has already made a stride in advance, which, if it does not necessitate a countermarch of equal extent, will greatly facilitate the operation of the process. In the Calumet mill the necessary lime or alkali is put into the cyanide solution, and that is used in the wet-crushing battery whence it flows with the pulp to the percolators.

Of course the liquid does not percolate as rapidly as it flows into the vat, hence the overflow is conducted by iron pipe to a sump, whence it is raised by a centrifugal pump of a kind which can swallow a little grit without gagging, and returned to the battery. When one vat is sufficiently charged with ore, the stream is turned into another, and the first is left to percolate, the liquid being "circulated," or repassed, several times before going to the precipitating box, where the dissolved precious metal is deposited on zinc shavings.

This arrangement has manifest advantages; it has also, from a theoretical point of view, defects, the importance of which can only be determined by experience. Mr. Paul has nearly completed another mill, not far from the Calumet, in which the ore will be crushed dry. This will enable him to make the necessary comparisons in that respect.

I doubt if it will do, in all cases, to add the alkali to the cyanide solution, and there

may be instances in which rather coarse crushing and percolation will be advantageously replaced by fine crushing, agitation and the filter-press. Also, I have an idea that electrolysis will be applied to the precipitation of the gold and silver. I do not suppose that the process will be applicable to all ores, nor that it will be applied in the same manner to all those which can be treated successfully by it. In short, I discern in it a wide field for study, practical and scientific, having already encountered some chemical puzzles.

This letter is not intended to be either formal or final. I believe the process to be of immense importance, even in its present stage of development, and I propose to return to Calumet when both of the mills are in operation, and make such investigations as will enable me to take the responsibility of positive statements of results, and Mr. Paul is willing for me to do so.

Moreover, I intend to make a specialty of this process, so convinced am I of its value. It is not difficult for me to believe in it because, in the first place, I believe Mr. Paul's statements of results, and, in the second place, I was aware of the main facts before the process was patented. Why I did not discover the practical applicability of those facts is "one of those things that no feller can find out" perhaps. Was it destiny or stupidity? In either case it was my kismet.

C. H. AARON.

The Prospector and the Sheepman.

KERNVILLE, April 23, 1892.

TO THE EDITOR:—There are but few changes to note in the mining outlook in this section. Some of the claims of the Sumner Mining Co. have recently been let to Mexicans for the purpose of having small bodies of surface rock worked on tribute; and this has given occasional employment to one or two batteries of the great 80 stamp mill of that company, which for the last nine years have otherwise remained idle. A little prospecting still continues in the region of the old town of Keyville, and five or six arrastres are occasionally seen running, as well as J. W. Sumner's mill on the old Mammoth lode.

The great curse of the mining prospector, however, is the ubiquitous sheepman. He hails from that portion of France bordering the Basque provinces, is unable to speak English, does not vote, pay taxes or have a home, drives his sheep everywhere that the plats show government land, and burns all thickets and dead timber behind him. Thirty-five thousand of these sheep pass up the south fork of Kern river every year, while I am told that taxes are only paid on 80,000 in Kern county, and nearly all of these in the hands of citizens who have a home. These roving bands come as a blight upon the country worse than Pharaoh's locusts. Even on deeded land they will lay waste a half mile in width if the owner is not constantly on his guard; and as for the prospector finding a bite of grass in the mountains for his donkey, the thing is an impossibility. The pack animals belonging with the band are grazed on a little patch near camp from which the sheep are herded; all else is laid waste. The native grasses being thus exterminated in the mountain meadows, the melting snow gutters out the soil to the bedrock, and at this season of the year the south fork runs as turbid as if a thousand mines were dumping the debris from their placers in the stream, whereas, in fact, there is not a home or laboring man in all that portion of Tulare county drained by this river, embracing perhaps 30 townships. Still, all the region I have referred to is but a highway to broader fields of conquest and desolation on the main Kern and on the desert to the east. Before the advent of the railroad or wagon road, many good mines were opened to the east, but abandoned on account of the extravagant cost of freighting from Visalia and Stockton; but now it is very difficult to relocate the scene of former operations, because the locality is, in very fact, desert and uninhabited.

From the summit of Piute mountains southward and eastward through Agua Caliente, Jaw Bone canyon and Red Rock, there is as fine a country for prospecting for the precious metals as there is on this coast; but there must first be wagon roads for the delivery of forage. The donkey will not survive after sheep. Respectfully,

STEPHEN BARTON.

FREEZING SHAFTS.—The Poestch refrigerating process for shaft-sinking is coming into greater application in France. The Lens and Marles colliery owners are using the method with it, it is stated, very satisfactorily results. In the Nord coal basin there are at present 13 new shafts in process of sinking.

Mock Gold.

On an Interesting Microscopical Specimen of Limonite in the Form of "Mock Gold," from Nevada.

A paper read before the San Francisco Microscopical Society, April 6th, by HENRY G. HANES, F. G. S.

Mr. J. T. Bradley of this city, returning from a recent visit to Nevada, brought with him from Bald mountain, White Pine county, a curious and rare mineral specimen, to which he has called my attention.

At first glance it would seem to be a ferruginous rock very rich in visible gold, but there is an indescribable difference in the appearance of the yellow mineral which leads the experienced miner to distrust his first impression.

When placed under the microscope, the true nature of this singular specimen is immediately revealed; the mass is then seen to resemble botryoidal limonite—presumably a pseudomorph after pyrite—mixed with hyaline quartz.

The foundation mineral, when magnified, resembles that variety of cassiterite known as "toad's-eye tin." Overlying this is the mock gold, in the form of an incrustation, deposited no doubt by the action of water.

In making the first microscopical examination, while testing the malleability of the illusive incrustation with the point of a pen-knife, I was surprised and interested to see the reflection of the blade from many spherical faces, proving that the surface of the mineral has a lustre quite equal to that of polished speculum metal.

It was my first impression that it was pyrite in its concretionary or radiated form, but I found it more brittle, and when broken from the mass and examined with a two-thirds objective, it did not show the striated characteristics of that mineral.

Blowpipe and microchemical reactions seem to prove conclusively that the mineral is really limonite, as first supposed. The streak is golden, ochery yellow; almost orange. In a closed glass tube it yields water, changes to a dark red color and becomes magnetic. The calcined mineral rubbed in an agate mortar yields a bright blood red powder; this dissolved in hydrochloric acid gives a yellow liquid which becomes deep red on adding sulphocyanide of ammonium. It therefore seems to be hydrated sesquioxide of iron (limonite) in a form peculiar and rare.

A discovery has recently been made in a cave in Iron mountain, Shasta county, of a stalactitic and stalagmitic limonite, having a copper-colored metallic tarnish; but, although the copper red predominates, small points and minute areas of the same bright gold-colored mineral under consideration may be plainly seen under the microscope.

The specific gravity of limonite being only 3.6 to 4, it will not remain in a pan or horn spoon, as gold does in washing.

About 26 years ago, another mock gold mineral caused considerable excitement, followed by disappointment, in Owen's valley, Inyo county. A new district was discovered with really rich gold quartz veins. When a portion of the vein matter was pulverized and washed in a horn spoon, the prospect obtained was unusually large; a considerable portion was really gold, but the greater part was a heavy yellow mineral which would not wash away, but which refused to amalgamate. It was some time before the miners would believe it was not gold in some peculiar condition. A blowpipe examination I made of it at the time showed it to be a lead mineral, probably wulfenite (molybdate of lead).

Some years since, a bronze-like, pulverulent mineral of a golden color and appearance, was brought to San Francisco from Pioche, Nevada; it was microcrystallized in minute hexagonal plates. At the time it was thought to be a rare form of limonite, but as that mineral is unknown in crystals, it was probably a mistake. It was a very beautiful microscopical object.

In Black canyon, Owen's valley, Inyo county, in the croppings of the Ida mine, the black rocks have a similar tarnish, and, strangely, there are minute octahedral crystals of genuine gold on the surface; they are wholly superficial, and their attachment to the rocks in isolated crystals still remains to be explained.

These minerals are very interesting, and with the exception of the last mentioned, I have brought them all for your inspection this evening.

A GERMAN PAPER states that Messrs. Siemens & Halske of Berlin have succeeded in producing a new telephone cable which the Bavarian telegraph authorities consider as an important advance for the introduction of the double wire system. The cable is suitable for long-distance telephony.

American Society of Mechanical Engineers.

San Francisco Meeting, May 16, 1892.

The American Society of Mechanical Engineers is one of the largest technical associations in this country, and has among its members many persons of international reputation. The objects of this Society are to promote the arts and sciences connected with engineering and mechanical construction, by means of meetings for social intercourse and the reading and discussion of professional papers.

To be eligible as a member, a candidate must have been so connected with certain professions as to be considered, in the opinion of the council, competent to take charge of work in his department, either as a designer or constructor, or else he must have been connected with the same as a teacher.

Mechanical, civil, military, mining, metallurgical and naval engineers, and architects of eminence, are to be found enrolled in the list of, and are, eligible as members. All the technical schools and colleges of the United States and Europe, where the sciences and arts are taught, are as a stepping stone to membership in this society. Our State University at Berkeley and the Leland Stanford Junior University of Palo Alto are now paving the way for California's best sons to membership.

From this it will be seen that these mechanical engineers, who propose crossing the continent to hold their spring session in the Academy of Sciences building in this city, are not merely people who can run a locomotive or construct a stationary engine, but they are skilled professional men of all arts, equipped to design or construct all great engineering works. Chas. H. Loring, its present president, was chief engineer of the North Atlantic blockading squadron during the first 18 months of the Rebellion, and participated in the famous battle between the Monitor and Merrimac, and the honored and lamented Ericsson, who designed that Monitor, was a member.

In the summer of 1889, this Society chartered the steamer City of Richmond and crossed the "pond" to visit their professional brethren in England, France and Germany. In London the party was formally received at the house of the Institution of Civil Engineers by the president, council and members. On the evening of the same day the Lord Mayor, Aldermen and Court of Common Council of the City of London tendered them Guild Hall, where they were banqueted. This in itself was an exceptional honor. In gracious response to application to the Queen, Her Majesty directed that special facilities should be afforded for visitors to Windsor Castle, including the private apartments, and to St. James and Buckingham Palaces. The Archbishop of Canterbury personally showed and explained the objects of interest at Lambeth Palace, while the Dean of Westminster delivered, in the Abbey, an address on the historical associations of that building.

Among the purely social entertainments offered were a garden party by the Baroness Burdett-Coutts; a reception by Lord Brassey, K. C. B., Associate Member Institute of Civil Engineers; and a dramatic performance in the grounds of Copp'd Hall, by invitation of Mr. S. B. Bolton, Associate Member Institute of Civil Engineers, while those having facilities for doing so vied with one another in their efforts to afford the visitors amusement and recreation during the six days of their stay in London. Special trains were granted by the principal railway companies to various places of engineering interest in and around London.

The trip of the Society to California takes somewhat after their trip to Europe. They will leave New York on Wednesday, May 4th, in special Pullman trains, visiting places of interest en route. Will arrive at Sacramento May 13th, where the afternoon will be spent; thence to Monterey, where they will remain at the Hotel del Monte over Sunday, arriving at the Palace Hotel, San Francisco, Monday, May 16th, upon which day their first meeting session will be held at the Academy of Sciences building.

Their stay in San Francisco as an organized body will extend to May 19th, during which time many valuable papers will be read and discussed, and municipal courtesies extended to them, as well as private entertainments, and visits to engineering works and other places of interest near our city.

A large local committee has been selected to assist in the entertainment of the distinguished visitors.

CHAS. G. YALE,
W. R. ECKART, Sec. of Local Com.
Chairman. 220 Market St., S. F.

Mexican Mines.

English and American Mining Company Failures.

The mining industry is the most important of all the industries in this country, says the Guaymas *El Trafico*, for all that it is the least protected. It is the mainstay of and affords the chief maintenance to all the other industries here, and it is therefore the duty of every one, and especially of us miners, to defend it, to bring to light the causes of the existing discredit from which the mining interests of Mexico suffer abroad and to stimulate, with all legitimate means at our command, the formation of companies for the exploration and development of our mines.

In order to encourage and attain the introduction of foreign capital, it is absolutely necessary to inspire foreign capitalists with such confidence as will convince them that they are afforded complete guarantee and protection in their enterprises; and in this respect there is hardly anything more to be desired, inasmuch as the Government of Mexico has at all times extended its full protection to foreign mining companies to the best of its ability, even in revolutionary times, as long as the representatives of such mining properties and interests have not meddled with the political matters and parties of our Republic.

The foreign capitalists have no longer any doubt as to the willingness of this Government to protect and assist foreign mining enterprises among us, but, unfortunately, the protection of the Government is not the only factor to be considered in the success of these enterprises, inasmuch as they frequently fail through causes which I shall briefly indicate, and the remedy of which lies within the reach of the interested parties.

The principal cause of failure with the foreign mining companies consists, in my opinion, in their lack of good judgment and knowledge when they select their superintendents, agents or managers in Mexico. In a great many cases managers are appointed who are not only no mining engineers, but who hardly know what a mine really is, and who very seldom possess practical business knowledge. I have myself known some that could not write their own language properly. Being incompetent themselves, it is readily understood that they lack the discernment necessary for the selection of such employees as might in a measure supply their own want of capacity. Confident in their own ignorance, they appoint for their assistants persons as ignorant as themselves, persons who are willing enough to undertake the work for the sake of the salary only, without taking the least interest in the outcome of the enterprise which in this play of "blind leading the blind" cannot fail to be disastrous. I have known cases of this kind where the necessary supplies of the mines were paid for at the rate of five times the actual market value.

And again there are cases where the superintendents exact and accept a certain commission from the merchant who furnishes the machinery, tools, supplies, etc., for the enterprise under their charge.

But even supposing that the greater part of the boards of directors of the foreign mining companies be of undoubted honesty, yet the proceedings of their meetings are quite frequently conducted with great flippancy which can only be explained by the fact or supposition that they have very little knowledge of the business in hand. It is not necessary to specify cases. I will only here allude to the weakness displayed by many of these foreign boards of mining directors who appoint agents, managers or superintendents to these important positions for the simple reason that they present themselves provided with a letter of recommendation from a mercantile house or perhaps a shareholder. It would appear that nowadays such recommendations are accepted as a matter of course, none of the board mustering the necessary energy to propose that the fact of the recommended person's possessing the stated qualifications be ascertained beyond a doubt; hence it follows that the superintendent thus selected, when he arrives at the mine, does not work for the best interest of the shareholders, but simply for the benefit or according to the whim of those who recommended him, and very frequently with the intention of gambling, with their knowledge and consent, in the rise and fall of the shares.

If, together with all this, the said appointee is no miner, it can easily be foreseen what will be the end of the business.

Such imprudent appointments have given rise to the belief that there are no skillful miners or capable engineers in those countries; but such is not the case, for we have here examples of mines whose owners live

abroad, which are managed by foreigners and give splendid results; but, unfortunately, we must admit that these mines belong to the minority.

It would also be well if the Secretary of the Interior would publish all the well accredited data obtainable as to mines and mining matters, so that the shareholders residing abroad might be enabled to inform themselves upon the true state of their mines and might compare these official reports with those obtained from their directors.

If by the means here indicated I may succeed in strengthening the confidence of the shareholders of foreign mining companies and better the results of their investment, I shall have the satisfaction of having contributed something toward the benefit of the mining industry, which is the one that advances most the prosperity of the country.

Evolution of Inventions.

A new departure will be made by the patent office at the World's Fair at Chicago. Hitherto it has never attempted to go beyond an exhibition of photographs and drawings. In this instance it will offer an elaborate and comprehensive display of models. The show will be designed to illustrate as completely and vividly as possible the age of mechanical civilization. It will give in concrete form a picture of the progress of invention.

The Commissioner of Patents says that the great exhibit of the patent office will not be displayed. All that will be attempted in the show proper of his bureau will be to illustrate the processes through which those achievements have been perfected. For this purpose, groups of models will be prepared. For example, one group will represent the progress of the steam engine, beginning with the first one, which was built 150 years before Christ, by a Greek named Hero. It had a boiler, and was able to do work by means of a shaft and belt attachment. From this primitive contrivance to the modern Corliss engine, in miniature, an interesting series will extend.

Other groups will be similarly arranged. One will represent the printing press, all the way from Gutenberg's original invention to the rotary Hoe machine, which turns out newspapers at the rate of many thousands per hour and folds them ready for delivery. In electricity, wonders of all sorts will be illustrated by progressive series. There will be telephones running all the way from the primitive conception to the perfected instrument now in use. The telegraph will be introduced with the actual instrument made by Morse, by which the first experimental messages were sent over the wire from Washington to Baltimore, this line of discovery culminating with the latest devices for printing messages at any distance with type and transmitting one's own handwriting across thousands of miles of space in a fraction of a second. The growth of the locomotive will be shown in like manner; also that of the sewing machine; of the marvelous modern agricultural implements from primitive types; of clocks, from the water clock of ancient Babylon and the later hour-glass, etc.

Many of the models required for these groups are already in the possession of the Patent Office, but a large number will have to be constructed especially for the purpose. Manufacturers all over the country will be asked to supply specimens of their products for representing the latest developments of inventive art. The locomotive works will be requested to lend miniature models of their newest engines. Makers of agricultural tools and sewing machines will contribute the most improved specimens of their handiwork. Likewise with printing presses and everything else. Few, if any, of the mechanical models will be set working, however.—Washington Star.

TO SUPPLANT STAMPS.—The Cave Springs mine, near Clifton, Deep Creek country, is to be provided with machinery at once. There are to be five machines for working the ore, each with a capacity of ten tons of ore per day. These machines are being made in Chicago and it is expected they will be in operation by the middle or last of June. The process is that of first crushing in rock breakers, and then the ore goes to these machines, which pulverize it by means of iron or steel balls running in a channel, and propelled by an upper disc resting on the balls. The process is amalgamation under water pressure, the quicksilver being below the grinders, while the pressure of water passing through carries off the waste and thus keeps only clean ore to be pulped by the crushers. The water pressure regulates the fineness without the use of screens. Some of this ore was tested

by one of these machines with exceedingly satisfactory results. Ore that sampled \$107 per ton in gold was worked up to \$103 in this test. The machine is the same as the one lately put into the Stewart No. 2 mill at Bingham.—S. L. Tribune.

Granitic Rocks.

The rocks of this group are characterized by a coarse grained, speckled or mottled appearance, arising from the fact that they are formed by the aggregation of distinct crystals or masses of different colors. Granite, which is the type of this group, consists of quartz, feldspar and mica. Sometimes the mica is wanting, and the quartz is in the form of curiously bent laminae, which on cross-section resemble Hebrew or Arabic characters, disseminated in a mass of feldspar. The rock is then called *graphic granite*; when the mica is replaced by hornblende, the rock is called *syenite*; when, in addition to the quartz and feldspar, both mica and hornblende occur, it is called *syenitic granite*. Most of the granite in this country is syenitic. The dark specks in granite are due to mica or hornblende; the opaque white, or reddish, or greenish, with distinct cleavage, is feldspar, and the grayish glassy is quartz.

Quartz is pure silica or silicic acid (SiO_2). Feldspar of this group is an acid silicate of alumina and alkali, potash or soda (orthoclase). Hornblende is a basic silicate of magnesia and lime, with also oxide of iron and alumina. Remembering also that hornblende is a black mineral, while quartz and feldspar are either colorless or very light colored, it is evident that this group may be divided into two subgroups, the one more acid and the other more basic; and in proportion as quartz and feldspar predominate, the rock is lighter colored, less dense and more acid; in proportion as hornblende predominates, it is darker, heavier and more basic. Granite may be taken as the type of the more acid subgroup, and the darker varieties of syenite as the type of the more basic subgroup. These subgroups graduate insensibly into each other. Since a general characteristic of the granite group is the existence of free quartz in notable quantity, this group, taken as a whole, is usually regarded as more acid than the other two groups.

Granitic rocks commonly occur forming the *axes and peaks* of mountain chains, or as *rounded masses* of greater or less extent, coming up through stratified rocks of the older series. They also sometimes occur as tortuous veins, running from an underlying mass into the stratified rocks above, as if forced by heavy pressure, while in a fused condition, into small, irregular fissures of the overlying strata, and sometimes, though rarely, as dykes filling great fissures, as in the elvans of Cornwall; but it is doubtful whether these should be considered as true granites. They are probably a quartz porphyry.

We have no distinct evidence that granite is ever an eruptive rock, *i. e.*, that it has ever been forced upward through great fissures of the earth's crust, and outpoured on the surface in the manner of lavas and traps; hence also ashes, cinders, tufas or other evidences of contact of a fused mass with the atmosphere, have never been found in connection with granites. Most geologists, therefore, believe that the granite, although it may be eruptive or intrusive by pressure, as explained above, is never an eruptive rock. Granitic rocks are most probably formed at great depths, and remain where they are formed. Whenever, therefore, they appear on the surface, it is probable they have been exposed by extensive denudation.—Joseph Le Conte.

The Precious Metals.

Director of the Mint, Leach, in his report to Congress on the production of precious metals for the calendar year 1891, says the gold product of the mines of the United States aggregated 1,604,840 fine ounces, value \$33,175,000, an increase of \$330,000 over the previous year, which was largely due to improved processes of treatment and the increased amount of gold extracted from lead and copper ores. The silver product was 58,350,000 fine ounces, an increase of 3,830,000 ounces over the previous year. The commercial value was \$57,630,040, or a coining value in silver dollars of \$75,416,565. The increased silver product was due to new discoveries in Colorado and Idaho and to cheapening the process of the smelting lead and copper ores bearing silver. The total amount of paper and metallic money in circulation on January 1, 1892, exclusive of the amount in the treasury and its branches, was \$1,592,393,629, against \$1,528,594,627 on January 1, 1891, an in-

crease of \$63,799,002. The amount of paper and metallic money in actual circulation on April 1, 1892, was \$1,608,641,520. The product of gold and silver in the world for the calendar year 1891 was \$124,229,000 gold and \$139,175,000 silver. The product of gold increased in 1891 over the prior year nearly \$5,000,000, the increase being principally in South Africa. The product of silver increased in 1891 over the previous year about 8,000,000 fine ounces. The increase in the silver product was principally in the United States, Australia and Bolivia.

Putting Inventions on the Market.

The following good advice to patentees we copy from the *Manufacturers' Gazette* (Boston). We commend it to the attention of patentees generally, who are too apt to reject very good offers for their patents soon after their issue.

We have frequently been asked by inventors who have succeeded in producing small articles of more or less merit, and for which there appears to be a demand, what is the best method to pursue in order to put them on the market.

This is a question which has puzzled a great many, and especially those who with small means are unable to go into the manufacturing of their specialty on a large scale, without parting with a controlling interest in their patent to another party in order to raise the necessary capital with which to push the business, a transaction which many object to on account of the possible and probable consequences which often follow, viz., the loss not only of the patent right, but of all share in future business.

In nine cases out of ten it is far better for the inventor, and he will realize more from his invention to sell out entirely and turn his attention to some other business, or the production of a new patentable article. That is, in case he has no money with which to develop and place his invention in the market.

The only difficulty in this is that a majority of inventors set too high value upon their inventions. They think they have the world in their hands, and are disposed to hold on to it unless some one comes along who is foolish enough to pay an unreasonable price for the patent. This is where they are often mistaken, and it would be far better for them to accept a *bona fide* offer, even though it is but a fraction of their ideal value of the article.

The fact is that no invention, however valuable at the time it is produced or perfected, is sure of a monopoly or even a fair competing chance for a great while, and the sooner the inventor disposes of it, the better off he is. Thousands of inventions have been dead failures, and never returned to the inventor one dollar, simply because, thinking that he held a monopoly, and that the world was bound to him, he has held on to it, unable himself to put it upon the market and alike unwilling to allow any one else to do so for a reasonable consideration until some one else has come out with something equally good, and possibly an improvement, and he finds himself without a bidder, and another man making money which he might have had, had he used better judgment and good sense.

Another way in which a mistake is made is in starting out on too large a scale. If you have a really valuable patented article, there is very little difficulty about finding a market for it, if you are not too hasty. It is better to begin in a small way and gradually increase than to begin by forming a large stock company and beginning too large. We are speaking in reference to the inventor's interests. If he can get his goods manufactured so that he can handle them himself, even though in a small way at the start, if his invention is worth anything, he will soon be able to increase his business and can then hold control of it himself. As a rule, we are of the opinion that it is better to contract with some reliable firm for the manufacture of the article than to go to the expense of putting in the necessary machinery, etc., to do it for yourself. This is especially true in relation to the smaller articles.

By doing it in this way, you are saved the care and management of a shop, and have more time to devote to pushing the sale of the article, and the difference in the cost is very little—hardly sufficient to compensate for the possible saving.

It also gives you the use of the capital which would be required to fit up and maintain a shop, with which to push the business, and at a time when it is needed, too.

After the business has grown sufficiently large to warrant it, then there is time enough to put in a plant, and you will be better able to do so, and you will be in a position to know what is required.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH CONSOLIDATED.—*Ledger*, April 23: Early this week, work on this property was brought to a standstill. A short time ago, a move was made to free the mine from water, and this gave birth to the hope that the deep levels of the mine were to be reopened and worked. All these expectations have been rudely dispelled by the entire cessation of work of every kind about the premises. What this means we are at a loss to know. Some look upon it as a freeze-out game. No one believes that it means the total abandonment of this famous mine, which paid handsome dividends right up to the time of the fire some years ago, and which has remained untouched in its lower levels ever since. The probability is that work has ceased, owing to the exhaustion of the surplus funds. By the last official report the cash on hand was very small, and must have been used up by the operations since January. The company, we believe, is not incorporated under the laws of California, and consequently the stock is not assessable the same as home organizations. The closing down has naturally had a discouraging effect upon Plymouth. Still, the mineral resources of that section, there is every reason to believe, will ultimately place the town on a prosperous footing, sooner or later.

MISCELLANEOUS.—Five stamps of the Amador Queen mill were started this week on the ore taken from the large pocket of metal met with lately. The ore carries lots of base metal, and whether it can be treated successfully by ordinary mill process is questionable. The Hardenberg mine at Middle Bar is reported to be looking exceedingly well. The ore shoot north of the shaft, in the lowest level, is eight feet wide, and of good average character. It is the regular ribbon rock formation, the quartz being identical with that of the Kennedy, Keystone, Pacific and other mines on the mother lode.

SUTTER CREEK.—*Cor Amador Ledger*, April 23: Taking out the water in the Hector mine is progressing favorably. They are down 135 feet now, and the skips are running well. James Opie, one of the most experienced miners in the county has charge of the shaft, repairing shaft and track as the water is lowered. The timbers are sound, and the shaft needs very little repairs, but the track is found to be a little shaky, and care has to be exercised to avoid accident.

PLYMOUTH.—The Pacific mine has shut down, most all the men being let off Sunday; the cause we are unable to state. Some of the miners think that it will not be long before it will start up in full blast again. They are keeping the water out until further orders from the company.

QUARTZ MOUNTAIN.—The developments made on the Gold Mountain Company's property have highly elated the superintendent and foreman. Mr. Farwell is not satisfied with the sheet or blanket of good paying ore that covers nearly 40 acres of the claim, and which varies from six inches to six feet in thickness. In prospecting, they have unearthed a vein that is running down at an angle of 60 or 65 degrees—something that surprises even the owners of the mine. Money and labor are not stinted. The tramway is progressing. The True Company are putting in two concentrators to compete with the Woodburys, with every requisite to give both an equal show.

Butte.

BANGOR.—*Cor. Oroville Mercury*, April 21: The mines here are paying a dividend and shipping virgin gold every week, which is conclusive evidence that those who possess the "Blue Lead" deposit have a sure thing.

Calaveras.

MURPHYS.—*Cor. Calaveras Citizen*, April 23: Geo. McCullom, superintendent of the Right Bower on Indian creek, was in town yesterday. He reports excellent progress in the tunnel, and has great faith in ultimate success. Over 3000 tons of quartz have been crushed from this mine that was of very high grade, and the wonder is, how capitalists passed it by. It is in good hands now—the Sheep Ranch combination—and developments will be pushed to a satisfactory conclusion. Eight hour shifts is the order in the tunnel. We predict this will be another dividend for Higgin & Co. Mr. Campbell is still pushing developments in the Washington on Indian creek. Some of the rich quartz, for which this mine is famous, is encountered in bunches in the tunnel as the drill cuts its way forward, but as yet no large bodies of quartz have been disclosed. On the Beatrice, one mile west of town, considerable progress has been made the past week. The indications are now favorable for striking the vein in a short time. The tunnel now being run is in over 300 feet, and will tap the vein at a depth of 200 feet. The Norfolk, on the eastern suburbs of town, still keeps up the full complement of men, and everything is working smoothly. Some exceedingly rich quartz is taken out of the mine.

OAE TO BE CRUSHED.—*Mt. Echo*, April 23: There are several mines in operation around Murphys having upon their dumps hundreds of tons of ore waiting to be crushed. We are informed by reliable parties that if some enterprising man would erect a five or ten stamp mill in the vicinity of Murphys, to do custom work, that he could get patronage enough to keep his mill running the year round.

PAID OFF.—All the indebtedness that was standing against the Brunner mine at Albany Flat has been paid off. The creditors have all got their money, and the property is again back into the hands of the original owner, Fred Brunner. Work will probably be resumed on

this mine shortly. It is the opinion of experienced mining men who have seen this mine that it is one of the best of mines in this locality.

Inyo.

A TIN STRIKE.—*Register*, April 23: Reports have been numerous of late concerning a rich strike of tin in Deep Spring valley. Investigation proves that there is some foundation for the rumors. No assays have been made as yet. But W. H. Uhlmeier of Big Pine, who is one of the parties interested, submitted specimens to State Mineralogist Irelan. The latter states that the ore contains metallic tin, a form so rare that its existence is questioned by many scientific men. The ledge is said to be immense, so it is hoped that the ore will prove to be something that will pay for working.

Los Angeles.

ACTON MINES.—*Acton Rooster*, April 23: Mr. John Roberts and wife and Mrs. Pierson are now from Los Angeles. Mr. Roberts is looking after his fine mining property up the Aliso canyon. Mr. E. Reckman has bought out the interest of the Padre mine, belonging to Mr. Griffith Johnston on Mt. Gleason, and will now push the wagon road for all it is worth, and also make other valuable improvements on Gleason. Some very fine specimens of quartz, such as have never before been seen, have been brought into our sanctum. This camp is going to heat every camp around this part of the country. Other rich mines and mining property are lying idle, awaiting the right man to take hold of them. We have no doubt but what this change is taking place now. Northern mining men are beginning to come here to look after our mining interests.

Mono.

THE BULWER CON.—*Bodie Miner*, April 23: The declaring of a ten cent dividend by the Bulwer last week is an important event in Bodie mining matters, and the friends of the district congratulate Supt. Kelly. The last dividend paid by this company was in 1884, and since then several assessments have been levied, the last of which was on October 28th. That after such a long period a dividend should again be declared, is significant, and refutes any statement that the camp is played out. There is no reason to doubt that the company will declare many more in the future. The work in the mine is progressing satisfactorily. A large quantity of ore is being accumulated, and prospecting continues.

SUMMIT.—The shaft is being cleaned out and retimbered as rapidly as possible, and this work will soon be completed. In the meantime, the extraction of ore goes on steadily.

THE BODIE CON.—The ore stops above 500 foot Jupiter shaft level continue to look about the same as last report. The rich ore in south drift, 700 Mono, is going down below our water level, so we have to start up our pumps night and day to lower the water to sink on it.

THE MONO.—The rich ore in stope, eight feet below the track in south drift 700, is going down below our water level. We have to start up our pumps night and day to lower the water and sink on it. The mill was kept running steadily.

Nevada.

MERRIMAC MINE.—*Grass Valley Union*, April 25: The work of cleaning out the main shaft of the Merrimac mine was completed yesterday, which reaches bottom at the depth of 300 feet. From there drifts are run, but to the distance they are in, or their condition, is not yet known, but this will be ascertained in a day or two. The shaft has been retimbered for 125 feet above the 300 level, and is now in excellent condition. A large ledge shows in the old workings of the mine so far as they have been opened, which produces ore of fair milling quality. If the ledge at the bottom is found to be as large as in the upper portion of the mine, even with rock yielding but \$6 or \$8 to the ton, it will be a paying proposition.

THE ONWAAD MINE.—*Grass Valley Telegraph*, April 23: The Onward mine is located near You Bet station, on the line of the narrow gauge railroad, and is owned by John M. Bufington of Nevada City, and others. The indications are that the ledge will soon be reached, as the contractors are making rapid progress. From prospects taken along the line of the croppings the company fully expect to soon find a paying ledge.

A MINE ATTACHED.—*Transcript*, April 21: J. B. Scully of San Francisco has attached the mining property of Tilton Bros. on Edwards' grade, for the sum of \$600, for a grocery and meat b.i.l. There are five claims in all, aggregating 7500 feet in length and 600 feet in width.

CHINESE REPLACED BY WHITE MEN.—*Nevada Herald*, April 23: We hear that the Chinese at the Union mine, Relief Hill, have all been discharged and white men employed in their stead. The Waukesha Co., also, have replaced the Chinese with white miners.

San Bernardino.

ANOTHER STRIKE.—*Needles Eye*, April 23: Word was brought into Needles last Monday that another big strike had been made in the Ibox camp, in a claim about one-fourth of a mile southeast of the Ibox shaft. The lucky man is a gentleman who has been working with Mr. Klinefelter for some time, and who is interested in the Cow Boy and other mines out there. When the *Eye* man was out at the Ibox camp, two weeks ago, he was shown this claim by the gentleman who owns it, but at that time not a lick of work had been done on it, and hence no note was made of the names, either of the location or of the party owning it. Captain Bethune, who is an old, experienced miner, visited the strike last Sunday, and he thinks the ore is richer than in the Ibox proper. There is no use in longer denying the fact that the Ibox country is full of gold, and shortly it will show itself up to be the finest mining camp in the West. The foothills in that locality have never yet been prospected, and there is a fine

opening there for some brilliant work. Miners and prospectors who mean business will do well to go out into that country and take up their locations and find out what they have, before hot weather comes.

Shasta.

NOTES.—*Redding Free Press*, April 23: Ore from the Ohio Company's mines, on Flat creek, is being gotten out, and hauling to the Shasta Company's mill will be commenced at once. The Shasta Gold Extraction Company's mill is now fully completed and will commence operations at once, working all ores by the MacArthur-Forrest process. Colonel Lyons of Old Diggings was in town this week, having been compelled to cease work on his tunnels by reason of the moist condition of the ground. He has done considerable work, however, since our visit to the mine, which he is developing in good shape. On account of the disagreements of partners and legal entanglements which have arisen, the reported sale of the Hidden Treasure mine, on Iron mountain, was not consummated when reported, but we understand that the difficulties standing in the way of a sale are being overcome, and that J. J. Kermeen will soon acquire possession. Mr. Rippetto arrived on the overland train Thursday morning. Since Mr. Rippetto's absence, at Salt Lake, he has been experimenting with the cyanide process, and has come to the conclusion that the ore of the Walker mine, at Old Diggings, can be successfully treated by it, and he proposes shortly to put in the plant necessary. The MacArthur-Forrest process, for the treatment of ores, is creating great interest among mining men, who are flocking to the Calumet works to see what can be seen and profit thereby. These works have been visited recently by Judge Spencer of San Francisco, Mr. Campbell of Yuba county, Chas. H. Aaron, a gentleman who has written several works on assaying and metallurgy, and C. H. Johnson of New York. These gentlemen were well paid for their visit.

SOUTH FORK.—*Courier*, April 23: W. H. Chynaweth visited the South Fork mines, near Igo, Wednesday, and came back very favorably impressed with the extent of the mineral wealth and possibilities of the section. Mr. C. is a practical and observing miner, who has followed the business for a lifetime, and informs us that, in his opinion, the South Fork is destined to be one of the very best mining camps in the county. The Black Prince mine, which he visited, owned by Robinson & Sons, is one of the most promising locations in the district. The upper wall of this mine is slate, and foot wall granite, a splendid indication of depth and permanence. The ore goes from 50 to 900 ounces of silver per ton. Streaks of pay ore between the walls are from 12 inches to 4 feet wide, and at the depth of 100 feet the vein shows every indication of richness and permanence. The mine has been bonded by an English company, whose time runs out in July, and if the new reduction works are completed and successfully work the ores, the chances are that they will take the property and invest a large amount of capital in it. Mr. Morley, who is putting up the works, says that, by his process, he can save from 90 to 97 per cent on ore. To send it to the Selby works costs ore producers \$36 per ton from the railroad. Mr. Morley proposes to work the ore by his process at a cost to the ore producers of 45 per cent, and guarantees to save 90 per cent, and if he can do so, the prosperity of the South Fork camp is assured. All the other mines in that locality are showing up well, and everybody out there is elated over the future prospects of South Fork.

Yuba.

AT SMARTSVILLE.—*Cor. Marysville Appeal*, April 23: The big strike in the Ayer mine at Mooney Flat continues to hold out and the boys have begun new drifts from the shaft in quest of other pockets which undoubtedly exist in that locality. The Wheaton mine at Mooney Flat, run by the arrastre and drift process, is worked by a party of young men and is upon a paying basis. The Blue Point mine at Smartsville is idle at present, as a portion of the old bank which started away during the hydraulic regime and which has been gradually seeking a lower level, came down during the stormy weather, carrying away the ditch which supplied the arrastres with water. Since then a force of men has been at work clearing and enlarging the old ditch. The work will be finished this week and after the new pipe has been laid, will be resumed. Patrick Campbell has erected a boarding-house for the men near the mine and everything will be in A 1 order when they begin again.

NEVADA.

Washoe District.

CONS. CAL. AND VIRGINIA.—*Chronicle*, April 23: There has been extracted from all parts of the mine during the week 1260 1410-2000 tons of ore, which were shipped to the Eureka mill. The average assay value of the ore worked at the Eureka mill during the week, 1405 tons, was \$19.21. Bullion shipped to the Carson Mint, assay value, \$54,748.17.

OPHR.—1465 level.—From the month of the north drift, from the drift run west from the winze 122 feet below the sill floor of the 1300 level, have continued our work in an easterly direction and extracted some ore therefrom. There have been raised to the surface during the week 21 tons of ore, the average assay value of which is \$18 per ton.

MEXICAN.—On the 1465 level the south drift from the crosscut running east from the bottom of the winze, 32 feet east from the winze, has been advanced 24 feet; total, 98 feet, continuing in porphyry and clay with quartz of low assay value.

UTAH.—The west drift from the shaft station, 340 level, has been extended a total length of 571 feet; face in vein porphyry showing fine lines of quartz and some clay.

SIERRA NEVADA.—The joint Sierra Nevada and

Union west drift from the shaft, 900 level, is extended a total distance west of shaft of 1868 feet; face in porphyry. The north drift from the Kenosha tunnel is advanced a total distance of 942 feet; face in porphyry.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, is extended a total distance west of shaft of 1868 feet; face in porphyry. The east crosscut, near south line from south lateral drift, 1570 feet west of shaft, 900 level, is extended a total length of 65 feet; face in porphyry and clay.

HALE & NORCAOSS.—On the 900 level upraise from east crosscut above this level, carried up during the week 15 feet; total height, 35 feet. Extracting fair grade ore from this upraise. Winze from this level sunk 15 feet; total depth, 50 feet; bottom in quartz yielding low assays. Hoisted from this level during the week 36 cars of ore, 1100 level.—An east crosscut started about 50 feet north and west of the shaft is advanced 35 feet; face in porphyry. Taking out ore from above and below this level. Extracted from this level during this week 371 tons of ore, 1450 level.—Stopping some ore on this level. Extracted from this stope during the week 137 cars of ore. Have men on repairs where needed in the mine. During the week have hoisted 544 cars of ore and shipped to the Brunswick mill 428 1780 2000 tons. Average assay of railroad car samples of ore shipped to Brunswick mill for five days of the week, \$18.69. Battery assay for the week, \$14.83. Concentrates from ore worked at Occidental mill shipped to Selby Smelting and Lead Co.'s Works. Shipped from Occidental mill to U. S. Mint, Carson, bullion of the assay value of \$487.18; shipped from Brunswick mill to U. S. Mint, Carson, bullion of the assay value of \$7959.04. Total shipments, \$8446.22.

CHOLLAR.—Are doing the usual amount of repairing on the 450 and 750 levels. Have done some repairing on the 1640 level south drift. The east crosscut on 1610 level, 150 feet south of north line, is out 75 feet; face in porphyry.

POTOSI.—Have repaired 50 feet of south drift on 250 level. Have connected the raise from the 1100 level with the 1000 level. The winze is down 226 feet below the 1500 level; the bottom shows about four feet of quartz on the footwall, which gives low assays. Potosi and Bullion west crosscut on south line, 1500 level, is out 142 feet; face in porphyry. Extracted and sent to mill 363 tons of ore from the 930, 1100, 1150 and 1200 levels. Milled during the week 370 tons; on hand at mill, 133 tons; average battery assay, \$23.20. Are repairing the Potosi and Bullion northwest drift, 1800 level, Ward shaft, and will resume work in the face when finished.

BULLION.—The east crosscut, 350 feet south of north line, 1300 level, is out 90 feet; last four feet in quartz that gives low assays. The joint Potosi and Bullion west crosscut on north line, 1500 level, is out 142 feet; face in porphyry.

ALPHA.—Have completed repairs to Alpha shaft and shut it down. Hereafter, all work will be done from the 1800 level of the Ward shaft. During the week have been retimbering the joint southwest drift from the Ward shaft, 1800 level.

OCCIDENTAL.—The west crosscut from the south drift, 400 level, is in 75 feet, face showing stringers of fair ore. North drift from bottom of winze from 450 level has been extended 10 feet in low-grade ore. West crosscut, 550 level, is in 37 feet. Have started a drift from this crosscut in ore assaying \$20 per ton. West crosscut No. 2, 750 level, is in 19 feet, and is just entering the ledge.

CON. NEW YORK.—The west drift from top of raise, 75 feet above 600 level, is out 38 feet; top in quartz, showing bunches of fair ore.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 675 feet; face in hard gypsum.

GOULD & CURRY.—On the Sutro tunnel level the joint north drift with the Savage Co. has been advanced 25 feet; total length, 379 feet; face in porphyry.

BEST & BELCHER.—900 level.—East crosscut No. 1 has been advanced 12 feet; total length, 84 feet; face in soft porphyry and stringers of quartz. West crosscut No. 1 has been advanced 23 feet through porphyry; total length, 198 feet.

ANDES.—On the 400 level west crosscut from north drift on east side of the ledge, advanced 15 feet; face in soft porphyry. During the week have been repairing connections between 175 and 350 levels to keep the airways open.

Pine Nut District.

PROSPECT.—*Genoa Courier*, April 25: The result of the ten tons of Monarch ore worked at Empire is \$134.87 in gold and \$9.90 in silver. The Monarch people are jubilant, and say they will go right ahead and erect a mill and "hoisting works." Fred Martin and Fred Klotz came in from Pine Nut bringing flattering news from the Monarch. They reported that the Monarch people had just struck the ledge at a depth of 104 feet in the main shaft, and that they had only cut through two and a half feet, and for that distance it was an excellent ledge, rich in gold and silver. They got their information from District Recorder Gray.

Hawthorne District.

GOOD OAE.—*Walker Lake Bulletin*, April 23: James Waddell arrived here from Hawthorne last Saturday with a carload of gold rock from the War Eagle mine in Hawthorne District, and owned by himself and Charles Kimball. He had the ore worked at the Franklin arrastre here by Mr. Savage. Mr. Waddell took a bar of bullion to the Carson mint yesterday that will return at least \$2000. Mr. Waddell arrived home on Monday and at once proceeded to whack up with his partner, Charley Kimball. He paid him \$1000 in five dollar gold pieces. The ten tons of ore yielded a bar of bullion worth \$2350. The gold was worth \$16.47 per ounce. Waddell & Kimball will at once begin work on a shaft for the better development of the mine.

PAMLILO.—Two sacks of ore taken from the

Pamlico mine last week yielded about \$1000. The ore was run through a hand crusher and panned out in Hawthorne. About two tons of ore taken from the same place were shipped to the Dayton arrastras and have not yet been heard from.

Tuscarora District.

NAVAJO.—*Times-Review*, April 22: North drift 350 foot level, has been extended eight feet. The vein continues without material change since last report.

NORTH BELLE ISLE.—West crosscut, 400 foot level, extended seven feet through seams giving low assays. Work has been resumed in No. 1 north drift, same level. Upraise from North intermediate above the 500 has been extended 12 feet. No. 1 upraise, south 500 foot level, extended 13 feet, and a drift extended north 10 feet, showing some fair grade ore.

NEVADA QUEEN.—Second level—No. 1 south drift advanced 20 feet, and No. 3 east crosscut 33 feet; will have them connected before the 1st. Have worked day shift in each of Nos. 1, 2 and 3 raises, all of which show continuous ore, average width 4 feet, assaying from \$106 to \$760. Third level—East drift from No. 3 raise in 16 feet, has exposed 18 inches of goods ore; looks well in the face. Stopes above third level show but little variation. Hoisted during the week 15 tons first class, average assay \$306 per ton, and 100 cars of second class, average \$52 21 per ton.

ARIZONA.

RICH WASTE ORE.—*Gazette*, April 23: Harry Watton went through the Bonsanza mine while he was in Harqua Hala this trip, and he says it is without exception the biggest thing he ever saw. He says the ore is very soft and can almost be shoveled up. The mill is running this month on what is termed waste, and the plates are heavily coated with gold. This waste is richer than some of the big gold mines can produce.

NEW MILL.—*Journal-Miner*, April 23: Eight men are employed on the Johnson group of mines near Stanton. During his recent visit East, J. A. Conley purchased a new mill, which will be placed on the property as soon as possible. He estimates that it will take about four months to get ready to start it up, and in the meantime he has arranged with A. L. Kerr for the use of the latter's mill to work the ore. Mr. Kerr is expected here in a few days, when the mill will be started up.

RICH ORE.—*Tucson Citizen*, April 23: Hon. Thomas Hughes is in receipt of a quantity of rich ore from the Prince Rupert mine, located in the Wrightson mining district, near Crittenden. The specimens show horn and wire silver and must necessarily be very rich. This ore gives generally a smelting return of from 150 to 320 ounces per ton. Some selected pieces have gone as high as 3000 ounces. The Rupert is the property of Mr. Thomas Hughes himself and D. W. Lyon, now in the city of Mexico, but have the same leased at present to parties from Bisbee, who ship a carload of ore of from 10 to 15 tons per month. It has six shafts of from 50 to 110 feet deep, with several drifts, and the "ore chute" 15 feet wide and 110 feet long without a break in it. This mine has been worked for some time, and a large amount of money has already been expended upon it, but now the owners will realize all they have paid out and have a bonanza left. Such is the history of mining.

DAKOTA.

SOUTHERN HILLS.—*Deadwood Pioneer*, April 23: Never since the days of the Bengal Tiger and other now abandoned properties have mining matters in the Southern Hills presented so encouraging an outlook. Developments on the Keystone mine have shown that, allowing for all natural exaggerations usual in such cases, a strike of great value has been made. Its richness and extent is still to be determined, but everything points to the conclusion that it will be permanent. Many other mines have been recently opened, among them the Spokane, Caliboga, Hayward group and others that go to show the immense value of the mineral deposits there when sufficient capital has been expended to open them properly. Near Custer there are deposits of telluride of value, but which have lain idle for want of proper facilities to work them. A movement is now on foot to secure the Four Mile stamp mill and fit it up as an experimental plant. If a satisfactory method of treatment can be secured it should make Custer a mining center of the Hills, second only to Deadwood.

NEW MEXICO.

TUNNEL.—*Silver City Enterprise*, April 22: W. H. Newcomb will let a contract in a few days to run a tunnel 600 feet, and to sink two shafts on the Mina Grande mine near Pinos Altos. One shaft is to be 65 feet deep, the other 135 feet. Work will be commenced next week. Troutman and Snyder Bros. have 11 feet of solid mineral in their claim on Copper Flat. They went through the iron and struck a well defined vein of copper glance ore carrying eight ounces in silver and two ounces in gold. Mr. Michael Murphy, one of the successful if not the most successful leaser in Lake valley, has, if reports are true, a veritable bonanza. He has been leasing regularly since the autumn of 1885, and has almost invariably made it pay handsomely. There is a specimen of ore from the "Jim Crow" mine, at Piedmont, on exhibition in the office of the Timmer house. It weighs 143 pounds and is valued at \$148. The average value of the ore ranges from \$1000 to \$3000 per ton. John Dodd has struck three feet of argentine in his Welcome mine at Black Hawk. The ore is yet not very rich, but it is increasing in depth is reached.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		NO. AMT. LEVIED, DELINQ. AND SALE.		SECRETARY.	
Alpha Cons M Co, Nevada	150	April 14, May 18, June 8	150	C E Elliott, 309 Montgomery	May 2
Belcher M Co, Nevada	150	March 8, April 16, May 3	150	C L Perkins, 331 Pine	May 4
Brinswick Cons M Co, California	150	April 15, May 18, June 3	150	F Stauffer, Jr, 309 Montgomery	May 11
Hullion M Co, Nevada	150	March 17, April 21, May 11	150	R H Grayson, 331 Pine St	May 11
Confidence M Co, Nevada	150	March 30, May 3, May 25	150	A Groth, 414 California	May 11
Con New York M Co, Nevada	150	March 10, April 12, May 5	150	C E Elliott, 309 Montgomery	May 11
Groven Point M Co, Nevada	150	March 15, April 19, May 12	150	J Newlands, 331 Pine	May 11
Kellogg M Co, California	150	April 23, May 25, June 15	150	C T. T. Fish, 309 Montgomery	May 11
Golden Piece Gravel M Co, California	150	Jan 30, Mar 24, May 7	150	W J Gileson, Phelan Block	May 11
Golden Prize Cons M Co, Nevada	150	Feb 29, May 3, May 23	150	C D Bennett	May 11
Cold Mountain M Co, California	150	March 29, May 3, May 23	150	J V. Harris, 213 Grant Avenue	May 11
Cray Eagle M Co, California	150	April 14, May 25, June 14	150	A W Barrows, 309 Montgomery	May 11
Hale & Norcross M Co, Nevada	150	March 24, Apr 28, May 20	150	A B Thompson, 309 Montgomery	May 11
Hood Centre and Tranquillity Co, Arizona	150	March 24, Apr 19, May 12	150	J W Pew, 316 Pine	May 11
Kentucky Cons M Co	150	March 22, April 26, May 19	150	J W Pew, 316 Pine	May 11
Keystone Cons M Co, California	150	March 9, April 19, May 9	150	J W Pew, 316 Pine	May 11
Locomotive M Co, Arizona	150	April 7, May 9, May 27	150	A K Fish, 309 Montgomery	May 11
North Belle Isle M Co, Nevada	150	March 1, April 5, May 3	150	J W Pew, 316 Pine	May 11
Occidental Cons M Co, Nevada	150	April 6, May 9, May 31	150	A K Durbrow, 309 Montgomery	May 11
Original Keystone M Co, Nevada	150	March 4, April 14, May 7	150	F E Lutz, 330 Pine	May 11
Ray Belcher & Belcher M Co, Nevada	150	March 14, April 18, May 11	150	E B Holmes, 309 Montgomery	May 11
Silver Hill M Co, Nevada	150	March 31, May 5, May 25	150	D B Bates, 309 Montgomery	May 11
Siskiyoun Cons Quicksilver Co, California	150	March 15, April 25, May 19	150	E F Stone, 306 Pine	May 11

MEETINGS.

COMPANY AND LOCATION.		MEETING. SECRETARY AND OFFICE IN S. F.		DATE.	
Church C M Co, California	150	Annual	A W Barrows, 309 California	May 2	May 2
Cons Amador Volcano Hydraulic M Co, Cal.	150	Annual	M Casey, 508 California	May 4	May 4
Cons Imperial M Co, Nevada	150	Annual	C L McCoy, 331 Pine	May 11	May 11
Commonwealth Cons M Co, Nevada	150	Annual	R E Grayson, 331 Pine	May 11	May 11
Gover Mining Co, Nevada	150	Annual	R E Grayson, 331 Pine	May 11	May 11
Imperial M Co, Nevada	150	Annual	C L McCoy, 331 Pine	May 11	May 11
Justice M Co, Nevada	150	Annual	R E Kelley, 419 California	May 11	May 11
La Grange Hydraulic Co, California	150	Annual	A Hays, 329 Montgomery	May 11	May 11
Little Joker M Co, Alaska	150	Annual	W Sessions, 39 Montgomery	May 11	May 11
Morgan M Co, California	150	Annual	L O Reese, 329 Montgomery	May 11	May 11
Northwestern M Co, Nevada	150	Annual	F A Hays, 314 Montgomery	May 11	May 11
Silverado M Co, Nevada	150	Annual	E F Cox, Chronicle Building	May 11	May 11
Sitka M Co, Alaska	150	Annual	G W Sessions, 309 Montgomery	May 11	May 11
Unga M Co, Alaska	150	Annual	G W Sessions, 309 Montgomery	May 11	May 11

LATEST DIVIDENDS.

COMPANY AND LOCATION.		AMOUNT.		SECRETARY AND OFFICE IN S. F.		PAYABLE.	
Cons Cal & Virginia M Co, Nevada	150	50	100	A W Barrows, 309 Montgomery	100	Ang 17	Ang 17
Eureka Cons M Co, Nevada	150	50	100	H P Bush, Sausame	100	Jan 6	Jan 6
Great Western Quicksilver M Co, Nevada	150	50	100	A Hays, 329 Montgomery	100	Oct 1	Oct 1
Pacific Coast Borax Co, California	150	100	100	A H Hough, 230 Montgomery	100	Apr 11	Apr 11
Standard Cons M Co, California	150	100	100	J W Pew, 316 Pine	100	Apr 25	Apr 25

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING April 6.	WEEK ENDING April 13.	WEEK ENDING April 20.	WEEK ENDING April 27.
Alpha	1.25	25	20	25
Alta	1.50	50	50	50
Andes	1.40	50	50	50
Belcher	1.35	1.10	1.40	1.25
Belle Isle	1.25	20	10	15
Best & Belcher	2.25	2.70	2.15	2.45
Bullion	1.70	45	50	50
Bodie	1.45	50	45	30
Bulwer	1.35	45	40	50
Commonwealth	1.15	15	10	40
Con. Va. & Cal.	1.55	5.25	4.75	4.35
Challenge	1.70	55	50	60
Chollar	1.05	1.25	90	85
Confidence	1.90	1.50	1.80	1.50
Con. Imperial	1.15	10	10	10
Crocker	1.70	55	55	70
Crocker	1.70	55	55	70
Dei Monte	1.15	10	10	10
Eureka Cons.	1.35	40	35	30
Excelsior	1.70	40	35	30
Grand Prize	1.30	1.50	1.20	1.10
Gould & Curry	1.30	1.50	1.20	1.10
Hale & Norcross	1.25	1.60	1.10	1.40
Justice	1.30	35	30	20
Kentucky	1.10	10	10	10
Lady Wash.	1.20	10	10	10
Mono	1.70	55	55	70
Mexican	1.75	2.00	1.80	1.50
Navajo	1.15	10	10	10
North Belle Isle	1.25	30	15	15
Nev. Queen	1.45	55	45	80
Occidental	1.70	55	55	70
Ophir	1.70	3.00	2.25	2.45
Overman	1.90	1.05	75	85
Potosi	1.15	1.40	1.05	1.15
Poor	1.05	10	10	10
Savage	1.35	1.60	1.15	1.60
S. B. & M.	1.35	40	35	20
Sierra Nevada	1.50	1.65	1.30	1.35
Silver Hill	1.05	10	10	10
Scorpion	1.40	1.55	1.15	1.25
Union Cons.	1.20	25	15	45
Utah	1.20	25	15	45
Yellow Jacket	1.05	1.15	95	1.10

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING APRIL 19, 1892.	
472,972.—MECHANICAL MOVEMENT—J. F. Appleby, Santa Cruz, Cal.	
473,374.—PROPELLER—J. T. Baldwin, Petaluma, Cal.	
473,412.—TREE PROP—D. Barker, Riverside, Cal.	
473,206.—LIFTING-JACK—G. P. Brinkman, Eureka, Cal.	
473,330.—PNEUMATIC CLUTCH—Jas. Brusie, Oakland, Cal.	
472,984.—MACHINE FOR MAKING SHEET METAL PIPE—J. P. Culver, Los Angeles, Cal.	
473,385.—AMALGAMATOR—W. E. Darrow, Amador, Cal.	
473,304.—SOLE—F. Ephraim, S. F.	
473,154.—HANGER FOR ELECTRIC WIRES—Imeson, Tibbets & Kellogg, Seattle, Wash.	
473,395.—AMALGAMATING SILVER ORES—Alexis Janin, S. F.	
473,420.—TRACE—E. B. Knapp, Riverside, Cal.	
473,075.—STIRRUP—A. Mayer, S. F.	
473,325.—FAUCET—S. L. Merrill, Los Angeles, Cal.	
473,343.—VISE—H. C. Rasner, S. F.	
473,348.—REVOLVING FILE AND INDEX—A. J. Rudolph, S. F.	
473,354.—SASH HOLDER—C. Scheibel, S. F.	
473,355.—FOLDING BED—L. Sekofsky, S. F.	
473,032.—BALANCED PISTON—W. J. Thomas, Sausalito, Cal.	
473,033.—SLATE CLEANER—A. Thurber, San Pablo, Cal.	
473,371.—STAMP MILL ATTACHMENT—L. R. Tulloch, Angels, Cal.	
473,037.—SPRAY ROD—W. Wainwright, S. F.	
473,049.—TEETH REGULATOR—D. R. Wilder, Los Angeles, Cal.	
473,279.—DITCHING MACHINE—J. J. Wishard, Sacramento, Cal.	
473,043.—WRENCH—J. A. Zander, S. F.	

The following brief list by telegraph, for April 19 will appear more complete on receipt of mail advices:

San Francisco.—I. A. Bishop and A. F. W. Bell, cable railway switch; Ed. A. H. Booth, stone or ore crusher machine; Joseph Clark, safe ty gas cook; James Davis, pocket cash accountant; Miles B. Dodge, engine; Walter P. Hall, filling physician's prescription; Henry Levy, industrial exp.; Richard S. Shroder, drink mixer; Adolph Schulenberg, concentrator; Francis N. Simmonds, punch; R. W. Whitney, cash register.

California.—Conrad and I. Baker, Santa Ana, truck; Earl B. French, Oakland, feed trough; William G. Ehring, San Diego, chisel, drilling or prospecting machine; George Gilpatrick, Martinez, animal extricator; William T. Gregg, Lakeport, door; Thomas Hardinge, San Jose, machine for filling; Edmund Harrison, Tulare, incubator; Edward K. Jones, Fort Bragg, plant frame; Herbert W. Pudas, Sacramento, machine for cutting screw threads on bolts; Edwin A. Tibbets and C. W. Sadler, Santa Cruz, cigar and ash holder.

Washington.—Peter C. Forester, Wilkeson, mining coal.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for American orders). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CONTINUOUS REVOLVING FILE AND INDEX.—A. J. Rudolph, San Francisco. No. 473,348. Dated April 19, 1892. This improvement in indexes and files consists of a revolving drum and chain, consisting of inflexible cards or surfaces adapted to be moved over said drum, each card being provided with a means for attaching slips or other matter suitable to be arranged thereon. This invention is of special advantage for library and publishers' catalogues, registers, dictionaries, gazettes, accounts, tables of contents, inventories, records, and, in fact, anything that needs alphabetical, chronological, numerical, classified or other systematic arrangement.

PNEUMATIC CLUTCH.—James Brusie, Oakland. No. 473,330. Dated April 19, 1892. This pneumatic clutch is designed to be used upon rotary machinery in which one portion is to be kept constantly running while the other portion is subject to stops without arresting the motion of the first-named portion. It consists of a pneumatically expandable tube or collar, fitted between the adjacent faces of the two portions of the machinery, and a shoe fitting the exterior of the expandable tube, whereby abrading friction between the tube and the outer portion of the clutch is relieved.

STAMP MILL ATTACHMENT.—Louis R. Tulloch, Angels, Calaveras county. No. 473,371. Dated April 19, 1892. Stamp mills are usually constructed with mortars having five stamps each. During the operation of the stamps it is frequently necessary to raise one or more of them so that they will not be acted upon by the cams, this operation being technically known as "hanging up" the stamps. This invention is designed to accomplish this hanging up of one or more of the stamps, and they may be released and put into operation again in the same manner.

PROPELLER.—John T. Baldwin, Petaluma. No. 473,374. Dated April 19, 1892. This system of endless propeller for vessels consists in an endless belt mounted on end drums at the bow and stern of the vessel, said belt extending and traveling longitudinally of the vessel, under its bottom, and carrying paddles. This propeller is specially adapted for flat or nearly straight bottomed vessels of uniform width of hull. The end drums, over which the propeller passes, are flanged and are housed so as to be practically watertight, and said drums are the full width of the vessel's hull. The endless paddle propeller sweeps the whole bottom of the vessel, and is kept in place by its own buoyancy and by suitable guides. The upper part of the propeller sweeps clear between the two drums

above the upper deck, and by being adjustable as to length its friction on the drums may be regulated to use the whole power of the engine. The inventor, in speaking of the advantages of his plan, says: "Ordinary vessels when running in rivers at good speed, are pushed by their propelling devices against the water, causing the latter to rise several hundred feet ahead of them, to fall nearly a foot abreast of them, and to pile up behind them in large waves, giving motion to a large amount of water constantly. In the ocean the same effect is produced, although it is not so apparent. By the use of this propeller, the water is beaten down in front of the paddles as fast as the vessel comes to it. The paddles take a good grip on the water the whole length and width of the vessel and in the deepest and best place. In practice, at a moderate speed, and in still water, there is no forward or side motion and but little back motion in the wake thus economizing power in a great degree and attaining high speed."

Mining Share Market.

SAN FRANCISCO, April 23, 1892.

Comstock mining shares continued to sell down up to Tuesday morning, when a slight up move set in to Crown Point and Belcher shares. It was reported that the Improved tone was due to a strike in Belcher and to Crown Point extracting ore. As the Belcher strike and that Crown Point would extract ore were known several days before, the advance was probably instigated through cross-orders so as to make a few short sellers fill at a loss, and then, as usual, make quotations and raise the market. The shares possible. It is a regular genuine milking process, and the milker is a master general at the process. The writer still holds to the opinion that the person who holds shares through the present unwarranted depression will have no cause for regret, provided he or she, as the case may be, is content with a fair profit on his or her investment, but is the way in which the mining share market is manipulated that is all wrong. Outside mining shares continue flat, stale and unprofitable.

Outside holders of mining shares are to be congratulated on the dawn of a new era in mining shares, for which they are primarily indebted to the Mining Stock Association, and later to a few leading commission brokers combining so as to avail themselves of a realization of the great wrongs which are perpetrated on the Comstock through the peculiar system of milking ores in vogue in that district. In this they have evidently awakened one set of managers to a realizing sense of the situation, for from personal observation and also from all that can be obtained from disinterested and reliable persons, the writer is thoroughly convinced that J. L. Flood, the young mining magnate, ably assisted by Attorney George R. Wells, is doing all in his power to create the reformations so persistently contended for by the MINING AND SCIENTIFIC PRESS in the interest of outside shareholders. Since the Hale & Norcross mine opened under his control, the mine has been instituted and large sums of money saved to shareholders. While these are very gratifying, yet the crowning event was done last week when Superintendent Rynn gave the railroad car samples of all ores sent to the mill, besides giving the battery or pulp assays of that mill. The pulp assays were within about 81 per cent of the car sample assays. This is about 25 per cent more than was done under the late management. In making public the car sample assays the annex's days have passed. We are credibly informed that the Savage Company will follow in the same line, as will Con. Virginia. It is needless to say that the management of the Gold Hill mines is still defiant; mining looting is too good a thing to give up. Perhaps a suit similar to the one which was brought against the late directors of the Hale & Norcross mine may have to be brought and prosecuted to a finish, to teach the managers that they are not such little gods as they imagine.

The superintendent of the Hale & Norcross mine, in his letter last week, gave the number of tons of ore extracted from each level, and the work done on each level, and the railroad car sample assays of all ore sent to the mill for reduction. This speaks volumes for the new management. The proceeds from the concentrates of the ore milled at the Occidental mill are to go to the mine and not to the mill. Let other superintendents comply with the law and follow the example of Mr. Rynn, then there is some hope for a revival in mining interests along the whole Pacific Coast. The concentrates were formerly worked in the "joker" for the mill ring. The new management of Hale & Norcross propose to turn these concentrates over to the stockholders—or to make it more pointed, all bullion taken from the ore will go to the mines. Speculators will have to take a revival in the price of the stock of the mine, because there will be no mill bullion to be divided.

On last Friday the control of the Savage Mining Co. was handed over to J. L. Flood, who is represented in the Board of Directors by George R. Wells, William Lytle and C. H. Fish. Mr. Wells was elected president. The change was brought about by W. T. Baggett, attorney for the Mining Stock Association. The annual election will take place in July. Reforms of the same kind that have been inaugurated in Hale & Norcross, will be carried out in the Savage.

The same instructions given by the new management of Hale & Norcross, have been sent to the president of Con. Virginia to Supt. Lyman of the latter mine.

The suits of Manuel Eyras against the directors of several mines on the Comstock will come up before Judge Hunt toward the last of next week, or else the fore part of the week following. Mr. Eyras sued each director for the sum of \$1000, in not having superintended the mine properly, and to a few leading commission brokers combining so as to avail themselves of a realization of the great wrongs which are perpetrated on the Comstock through the peculiar system of milking ores in vogue in that district. In this they have evidently awakened one set of managers to a realizing sense of the situation, for from personal observation and also from all that can be obtained from disinterested and reliable persons, the writer is thoroughly convinced that J. L. Flood, the young mining magnate, ably assisted by Attorney George R. Wells, is doing all in his power to create the reformations so persistently contended for by the MINING AND SCIENTIFIC PRESS in the interest of outside shareholders. Since the Hale & Norcross mine opened under his control, the mine has been instituted and large sums of money saved to shareholders. While these are very gratifying, yet the crowning event was done last week when Superintendent Rynn gave the railroad car samples of all ores sent to the mill, besides giving the battery or pulp assays of that mill. The pulp assays were within about 81 per cent of the car sample assays. This is about 25 per cent more than was done under the late management. In making public the car sample assays the annex's days have passed. We are credibly informed that the Savage Company will follow in the same line, as will Con. Virginia. It is needless to say that the management of the Gold Hill mines is still defiant; mining looting is too good a thing to give up. Perhaps a suit similar to the one which was brought against the late directors of the Hale & Norcross mine may have to be brought and prosecuted to a finish, to teach the managers that they are not such little gods as they imagine.

News from the Bodie district reports the ore in the waste dump below the 700-foot level, even though it is claimed that it is very rich. It is claimed that it will run into Bodie. The mill is to be enlarged from a capacity of 10 tons daily to 25 tons daily. It is still running on Mono ore. The pulp assays for the week were over \$38 a ton. The prospects in Bulwer, Summit and Bodie could not be better. No change is reported in the Quibota or Tuba mines. The change in the Comstock district the news is uniformly of the very best character, much of which is not even touched on in official letters. It is said that on the 1800-foot Ward shaft level, arrangements have been made to run inter drifts north and south from the end of the cross-drift, so as to develop later on, by east and west cross-drifts, Alpha, Exchange, Bulwer and Potosi at that depth. While this is being done, work on the upper levels will be discontinued. A rich strike is reported in two of the Gold Hill mines. Developing work in Con. Virginia, on the 1900 level, is to be commenced soon.

A Smokeless Locomotive.

Extracting Metals by Electricity.

Dynamical Theory of Earthquakes.

Magnetic Iron Rust.

TWO NEW AERONAUTIC INVENTIONS.—A German aeronaut, Herr Heinrich Lattermann, says *Iron*, has devised two aerial machines which are attracting much notice on the Continent. The first is a new kind of parachute, which, it is stated, is but half the size of any hitherto used, and can be rolled up like a cloak. When the hazardous leap is made, the parachute instantly unfolds and expands. This form of parachute is considered to be of great importance in view of its lightness, permitting several of the apparatus to be carried and used in case of emergency by as many persons. It is added that the parachute can be employed in any weather without danger of entanglement in the network of the balloon. A further advantage is claimed in that the rapidity with which the parachute opens renders it possible to the aeronaut to descend almost on the spot whence he embarked, as precipitation from the balloon may take place from a comparatively insignificant height, before the balloon has begun to make much lateral headway. The second invention is a gigantic parachute balloon, the distinguishing feature of which is the attachment of a balloon of a capacity of about two cubic meters being converted into a parachute. The balloon is of spherical shape, and is so constructed that the under portion may at any decided moment be turned to collapse with the aid of a valve. When the balloon assumes its normal shape, the parachute of more than 100 square feet is in readiness for use.

ment of the balloon is, as a precaution, prepared with asbestos and other fireproof materials. Heated air for filling the bag is to be supplied by a furnace of Hatteman's own make. The first ascent with these new apparatus will shortly be made in Berlin. In August the inventor purposes proceeding to Chicago, with the object of making arrangements for a series of aerostatic exhibitions during the forthcoming exhibition in that city.

TEMPERATURE OF MELTING STEEL.—In a communication to the Paris Academie des Sciences, M. Le Chatelier states that by means of his pyrometer he has discovered that the temperatures which occur in melting steel and in other industrial operations have been overestimated. These exaggerations, we learn from *Engineering*, the author attributes to several causes. When estimates of temperature disagree, there is a natural tendency to adopt the highest, because there is an instinctive desire to establish some sort of proportionality between the light emitted from a heated body, the amount of fuel required and the temperature. But the fact is that both the amount of light emitted from a body and the quantity of fuel required to heat it, increase much more rapidly than the temperature. Moreover, the calorimetric method has been that most frequently adopted for determining high temperatures. In this the assumption is made that the specific heat of the iron rods or balls used is constant, which is inaccurate. In the case of the flame of the Bessemer converter, Mr. Langley has fixed the temperature of the issuing flame at 2000° C., because platinum appears to melt rapidly in it. Mr. Chatelier has, however, found that platinum does not fuse in the flame, but only appears to do so because it alloys itself with drops of molten steel carried over by the blast.

ELECTRICITY.

Peculiar Behavior of Oil as an Insulator.

Now that oil is universally recognized as a good insulator, and that its use is not patentable, says the *Electrical World*, reports its shortcomings are beginning to appear of which seem to show that, although very good under certain conditions, it has certain peculiar qualities which warn us to proceed slowly with the use of it until we know more about its idiosyncrasies. Prof. Elihu Thomson, who has experimented perhaps more than any one else in this field, noticed during the course of his experiments some curious anomalies which at first could not be understood. He found, for instance, that with very moderate potentials, puncture through the oil would occur in some cases through considerable distances, while in other cases the insulation was maintained. His experiments, which are not yet completed, seem to indicate that low periodicities of 125 or thereabouts, and comparatively smooth waves of current, such as are given out by the ordinary alternating current apparatus, will cause puncture over much longer distances under oil than occur with very high period current discharges. In fact, in some of the experiments the striking distances in oil have been approximately like those in air, falling not much below. With potentials from a high period machine giving from 3000 to 5000 alternations per second, the insulating quality of the oil seemed to be much better, and his experiments show that with high periods and very high voltages the insulating qualities of oil are all that could be desired. One of the most curious effects which he noticed in the course of his researches was that it takes time to break down oil; that momentary contacts are by no means sufficient to cause puncture, but that if the alternating waves are kept on for periods varying from a few seconds to half a minute or more, the oil will break down at last; and, furthermore, that the wider the distance between the electrodes the longer the time it seems to take to break it down. It is suggested that there may exist in the oil conducting particles which arrange themselves very much as iron filings do in a magnetic field; also that there may be some sort of convection which carries electrified oil from the electrodes into the space between them, finally breaking down the oil. He is at present continuing to investigate the subject more fully, and with his well-known perseverance we have no doubt he will soon get at definite and reliable results. In order to see whether the same element can be extended, he intends to keep the oil flowing under pressure between the electrodes. To show how curious some of the results are, he found that under certain circumstances, potentials which perforated oil at a distance of three-eighths of an

inch, at other times failed to puncture the same oil at a thirty-second of an inch. Such results certainly show that it is very necessary to investigate the subject more fully before relying too much on the small amount of knowledge we have up to the present time, regarding the insulating properties of oil. The law of resistance, which is such a simple one for continuous currents, appears to be a very complicated one when it concerns alternating currents, and especially so, apparently, when these alternating currents are of high frequency and exceedingly high potential. It would be a very valuable contribution to our knowledge of the subject of the insulating properties of oil if those who have the facilities will endeavor to discover its law—if there is any—before we make any mistakes by relying on our present insufficient knowledge of the subject.

An Era in Local Telephone Industry.

California will presently have as perfect a telephone system as any section of the Union. It will be possible for a resident of Ukiah to talk with a friend in San Diego without going farther than the nearest telephone stand, and it won't be as wearisome to do so as it sometimes is now to talk with your butcher in the next block.

The Sunset Company is making these improvements. Recently there arrived at the Oakland mole a monstrous cable, which will connect San Francisco and Oakland. It came over from New York in a car specially built for its carriage, for its 70,000 pounds would have been too much for the ordinary flatcar.

This great rope is said to be the very acme of perfection in the line of submarine cables. It is composed of 30 wires so incased in nonconducting materials that the loss of power will be almost nil. Each of the 30 consists of three minute lines of copper wound around one another; these are incased in rubber, and around the rubber is a tape; around the 30 which make up the core of the rope is wound more tape, and outside of this is a heavy thickness of a patent preparation called *okonite*; finally, surrounding and protecting all, is an armor of galvanized iron wires.

This section, weighing 70,000 pounds, will be stretched from the wharf to Goat island; across the island the current will be carried by 40 heavy copper land wires, and from the other side a similar cable will carry the messages to Oakland. Hitherto, communication with interior points has been over a ten-wire cable and ordinary iron lines. The cable has been supplanted, and so presently will be the iron lines.

The company has already established between San Francisco, Stockton and Sacramento an improved metallic circuit service, making it possible to hear at one place a whisper spoken at the other. Copper wires are being stretched to all interior points, and in a few months one end of the State will be in communication with the other. The company has contracted for 10,000 poles and 4000 miles of copper wire, and the lines are being strung along as rapidly as possible. Five hundred thousand dollars will be spent in this work this year.

Applying the Motors.

Mechanical and electrical engineers who have, during the last few years, had more or less discussion on the advisability of having motors on each axle or at the head of trains where electricity is used to supplant steam motive power on light railways, will soon have an opportunity of judging of the wisdom of the positions they each have taken. The City and South London Railway, to which reference has frequently been made, is run by motors at the head of each train, this arrangement being adopted after a full consideration of the merits of the two plans, because of the fact that it made fewer motors to take care of, and that in underground work it would be especially objectionable to have a series of motors removed from the immediate inspection of the driver and practically inaccessible in case of accidents of any kind. On the other hand, the Liverpool Elevated Railway, which is in process of construction, is also going to be run by electricity, but the motors are to be applied to each car. This arrangement of motors was also adopted only after careful consideration, and in this case was one of necessity rather than one of choice, as the exigencies of construction necessitated a light elevated structure and a heavy locomotive at the head of each train would prove very undesirable, and for that reason it has been decided to use individual motors with a full realization of the greater amount of machinery which must thus be taken care of, the objection being in a measure mitigated

by the fact that the nature of the line makes the motors readily accessible and serious trouble from this cause less probable. It will therefore be seen that the narrow limits of a tunnel and the inaccessibility of motors have in one case led to the adoption of a single motor at the head of the train, and that the lightness of the structure has in the other case necessitated the employment of motors in each car. When these two lines have been in operation for a long enough time to get some tangible results from the performances of the motors, electricians and mechanical engineers will then have a chance to settle definitely this question of the arrangement of electrical motors for railroad work.—*Railway Review*.

IN connection with the recent experiments in high potential discharges of great frequency, made by Tesla and Thomson, and the long-distance power transmission tests in Germany, it is interesting to note that the use of oil as an insulator, whose value was so well proved for use in these different connections, is authoritatively stated not to be patentable, and the use of this insulating material is, therefore, free to everybody.

AN electric tuning box for the use of leaders of orchestras and others interested in music has been invented by a Frenchman. It consists of a dry-pile battery connected with an electric magnet. When placed on a sounding board, the required note is obtained by moving a small commutator located in the box.

A RECENTLY DESIGNED incandescent electric lamp, supported by springs, is intended for use in carriages and other vehicles. Current is to be supplied from a storage battery carried under the seat or in any convenient place.

USEFUL INFORMATION.

A Curious Air Barometer.

The following is a novel illustration of an air barometer—a phenomenon connected with an automatic ink well, says the *Optician*. The well consists of a glass vessel having in the top two apertures—one containing a funnel-shaped fountain dipping into the ink and the other holding a screw, the end of which presses on a rubber disc. The principle of the ink well is simple. It will be noticed that there is no connection between the atmosphere on the outside and the air imprisoned in the vessel; also, that as the screw is moved up or down, the space not occupied by the ink increases or decreases. When, therefore, it is desired to have the ink rise in the fountain, the screw is turned down so as to press down the rubber disc. It will readily be seen that as the space is thus decreased, the inclosed air becomes compressed; but, by the force of its elasticity, it presses upon the ink and forces it into the fountain. When the screw is turned up again, the capacity is increased, the tension of the air inside is lessened, and the ink in the well falls. In this simple way, a writer, by turning the screw one way or the other, can cause the ink to fill the fountain brimful, or to recede to its black depths. However—and this brings us to our curious air barometer—it was noticed that the ink in the fountain would rise and fall, although the screw remained unmoved, and would thus continue to fluctuate at regular intervals. At first the cause seemed to be the changing temperature of the room, which, of course, would affect it. The expansion of the inclosed air, due to the rise of temperature, would cause the ink to rise, while a contraction of the air from a lower temperature would be followed by a corresponding sinking of the fluid. But the fountain would be filled sometimes at a low temperature, when we should have expected it to be nearly empty. Obviously, the cause was the varying pressure of the external atmosphere. At a low barometric pressure, the tension of the inside air being greater than the atmospheric pressure, would cause the ink to rise in the fountain. At rising barometer, on the other hand, the excess pressure would be from without in, and a consequent falling of the liquid column would ensue. In short, the ink well was a modified air barometer, and would have served not only its principal purpose, but, if it had been carefully protected from the variations of temperature, would excellently have filled the office of an air barometer.

UTILIZING SMOKE DUST.—An important German mining and metallurgical concern, the Georgs-Marien Verein, which possesses several blast furnaces, utilizes the dust deposited by the smoke of the furnaces, mixing

it with pyrites debris, in order to recover the iron contained in the gases. The process consists in blending this residuum with the pyrites debris, the mixture then being formed into briquettes for roasting. The presence of the dust, disengaged from the blast furnace throats, considerably augments the cohesion of the briquettes.

GOOD HEALTH.

CHRONIC ARSENICAL POISONING.—A good example of chronic arsenical poisoning on a large scale occurred in County Asylum, Berrywood, and a short account of it may be both interesting and instructive. In the endeavor to make the wards of an asylum bright and cheerful, and to do this at as little expense as possible, it is not improbable that the nature of the coloring materials used may be overlooked, and that some of the gastric and intestinal disorders which disturb the peace of mind of medical superintendents may be cases of arsenical poisoning. For a long period the nurses here were in poor health. First one and then another was laid down until, within a few months, nearly every nurse on the staff had been, or was, under medical treatment. Headache, neuralgias, gastric derangements, loss of appetite, constipation or diarrhoea, irritation of eyelids, anæmia—these were the chief symptoms complained of. Drugs did not appear of much avail, but a holiday had a marked effect for good. At last one nurse had the eye symptoms in a more pronounced form, and suspicion was aroused. In each nurse's room was a green baize curtain, used as a covering for dresses, etc. A portion was taken and examined. It was found to be impregnated with arsenic to an astonishing extent. These curtains were removed; the rooms freely ventilated; medical treatment was stopped; the symptoms disappeared, and, though some months have elapsed, have not returned. The baize was similar to that used for covering doors, etc., and was obtained from two manufacturers.—W. Harding, M. B., in the *Lancet*.

SOPORIFIC PROPERTIES OF LETTUCE.—Although preparations of lettuce have from very early times had a reputation in medicine for their soporific properties, the narcotic constituent of the plant has never been ascertained with any certainty. Various neutral, fatty, and waxy bodies separated from the milky sap of different species of *Lactuca* have been from time to time described as compounds of medicinal value, but on the other hand it has been denied that the dried milk sap, *lactucarium*, in spite of its narcotic odor, possesses any sedative action, and in fact, this preparation is no longer official in England or the United States. It is, therefore, interesting to learn in a communication from the Research Laboratory of the Pharmaceutical Society, read recently before the Clinical Society, that Mr. T. S. Dymond has established beyond doubt the presence of hyoscyamine, the principal alkaloid of belladonna and henbane, not only in the cabbage and *Cos* varieties of the common lettuce, *L. sativa*, but also in the wild lettuce, *L. virosa*. The amount in the young plants is certainly very minute, but in the official green extract, which, according to the directions of the "British Pharmacopœia," is to be prepared from the flowering herb of *L. virosa*, the mydriatic alkaloid occurs to the extent of 0.02 per cent.

THE BEST MOSQUITO REMEDY.—Mr. C. H. Russel, of Bridgeport, Conn., has recently communicated to us the following interesting fact: A very high tide recently broke away the dike and flooded the salt meadows of Stratford, Conn. The receding tide left two lakes, nearly side by side, of the same size. In one lake the tide left a dozen or more small fishes, while the other one was fishless. A recent examination showed that while the fishless lake contained tens of thousands of mosquito larvae, that containing the fishes had in it no larvae. An English gentleman living on the Riviera, according to a correspondent of *Nature*, having been troubled by mosquitoes, discovered that they bred in the large tanks kept for the purpose of storing fresh water, which is rather a rare commodity at this Mediterranean resort. He put a pair of carp in each tank and succeeded in this way in extirpating the insect pest. The utilization of fish in this way is an old suggestion, and a very practical one under some circumstances. Many people suffer from the mosquito plague when the insect breeds in a circumscribed and easily accessible place, and where it could be destroyed by some such method as that used by the level-headed Englishman.—*Insect Life*.



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SAN FRANCISCO:

SATURDAY, APRIL 30, 1892.

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The Comet.

The comet discovered by Swift of Rochester on March 7th (comet b, 1892), is so bright that the head and nucleus may be seen by the naked eye in bright moonlight, while the tail may be seen now on any clear morning.

Those having star maps may easily find it by inspecting the following places on the dates given below:

Date.	R. A.	Dec. North.
May 1.....	22h. 32m.	20° 54'
May 2.....	22h. 33m.	21° 18'
May 3.....	22h. 33m.	22° 00'
May 4.....	22h. 41m.	22° 41'
May 5.....	22h. 44m.	23° 22'
May 6.....	22h. 47m.	24° 03'

Those without star maps may find the comet in the following manner: Observe the exact position of the sun on April 30th at 7 A. M. On May 1st at 3 A. M. the comet will be found in exactly the same place, excepting that it will be just ten times the diameter of the sun north of the position the sun occupied on the 30th at 7 A. M.

On the 4th the comet will at 3 A. M. be just thirteen diameters of the sun north of the place occupied by the sun on the 3d at 7 A. M.

The observer may work out the position for the other and intermediate dates himself—it will be good practice for him. A good opera glass is all that is needed for a good view on these dates. This comet is the brightest one discovered since the grand one of 1852, and will be visible for perhaps more than a month, but, as it is now receding, between now and the next moon will be the best time to observe it.

After the above dates the moon will seri-

ously interfere with the fainter parts and powerful telescopes only will give satisfactory views.

Silver Clubs and Leagues.

The work of organizing "Silver Clubs" in Colorado, Nevada and other silver States continues to be energetically carried on. In the two States mentioned State Silver Leagues have been organized. The plan is now to desert the old political parties, as parties, and vote for no man for President unless he shall be unreservedly in favor of the free coinage of silver. One of the resolutions of the Denver Silver Club contains the pith of the new movement and is as follows: "We believe the time is now come when every voter in the Nation should rise to the dignity of an American citizen and make haste to assert his independence of any political party, unless that party shall protect his rights from the merciless grasp of the money power."

The new movement started only a little over a month ago in Denver, Col. The work began by an organization of silver clubs throughout the mining camps and larger towns. It soon became apparent that the sentiment expressed by the resolutions adopted by these various clubs was the sentiment of a large mass of voters throughout the country, and that a State organization was both feasible and desirable. When some 40 clubs had been organized, a conference of the presidents of these clubs was called, and held in Denver on the 26th ult. More than 30 of the clubs were represented at that meeting, and a State organization was perfected, which is now in working order.

Regarding the growth of the movement, it may be said that there are now nearly 70 clubs in active operation in different parts of Colorado (mostly, however, in the mountains), with an aggregate membership of something upward of 25,000. The number will be definitely known within a few days, when the committee shall come to apportion delegates to the State Silver Convention. The Denver club alone now numbers over 10,000 voters.

The resolution quoted above is the pledge that serves to bind the members together as a distinct organization, and it is this feature which sends consternation to the heart of the petty politician. In the beginning they sneered at it, and expressed doubts as to its carrying weight. These doubts, however, are rapidly disappearing, and their place is being filled by fears of what may be accomplished. Certainly, as far as Colorado is concerned, the outlook is promising in the extreme, the movement is popular beyond precedent, and the members there are anxious to see it extend, at least, throughout the silver-producing States and Territories.

It is hoped that this growth will be sufficiently rapid to place the friends of silver in these States on a working basis, to the end that their influence, in common with the Colorado men, may be felt at the Minneapolis Convention. The force of the entire West, at that Convention, should be ready to act as a unit on all questions touching Western interests, especially the silver questions and the presidential candidate. In Nevada this movement has made a good start, and a State Silver League is engaged in enrolling voters irrespective of party.

COST OF CYANIDE.—Mr. A. B. Paul, Jr. writes us that Mr. Merrill has made a mistake in figuring the cost per ton of the cyanide, in his article of last week. He states it would cost \$7.50 per ton for the salt as per his experiments. In actual work Mr. Paul said they "find the loss to be about two pounds per ton. The process calls for C. P. cyanide and that grade can be furnished for, o. b., New York at 50 cents per pound. It is guaranteed at not less than 98 per cent. Hence the cost for cyanide of the required grade per ton is but one dollar."

Saving Float Gold.

In the recovery of precious metals from their ores it is well known that the crushing and grinding process to which the ore is subjected produces a fine, impalpable slime, which carries a great deal of fine gold and mercury which have been triturated by the preceding operation to such an extent that they will float upon the surface of the water and are very difficult to bring into contact with any amalgamated plates or surfaces over which the material passes.

W. E. Darrow of Amador, Amador Co., has just patented through the MINING AND SCIENTIFIC PRESS PATENT AGENCY an appliance which is designed to bring these slimes into intimate and forcible contact with amalgamating surfaces without subjecting them to the cutting action of the coarser sands which are carried along with them. It consists of corrugated amalgamated plates situated one above the other, with the corrugations extending longitudinally and the corrugations of one projecting into the spaces of the other. One of these plates is stationary and the other has a shaking movement.

The operation is as follows: The amalgamator is placed in front of the battery, though the pulp is first allowed to flow over an ordinary amalgamating plate. The pulp then flows over the amalgam trap at the upper end of the apparatus and thence upon the shaking table or lower plate. The shaking motion causes the pulp to be splashed from side to side, the surface being dashed against the amalgamated corrugations of both the upper and lower plates so that any fine valuable material carried in the slime will be brought into forcible contact with these amalgamated surfaces. The operation is such that the slimes are subjected to violent motion which will repeatedly and constantly throw them into intimate contact with the amalgamated surfaces so that the valuable precious metals will be retained thereon while the heavier material will flow along in the depressions between the ridges. Any small particles are caught in the amalgam trap at the lower end.

The lower sluice is movable and the ridges or corrugations extend from one end to the other. The sides are higher than the ridges, so the material will not splash over. The sluice is supported upon elastic arms or springs, and these may be raised or lowered to keep the sluice level transversely and adjust it. At the upper and lower ends are traps or semi-cylindrical troughs. These are copper-lined and serve to collect any particles of amalgam or precious metal which are heavy enough to drop into them. This table or sluice is given a side-shaking motion by means of suitable rods and cranks.

A second amalgamated plate is supported above the lower one and has corresponding corrugations projecting downwardly between those in the lower plate. This stationary table or plate is adjustable with relation to the lower or shaking table so as to maintain a proper distance to allow the coarse material to flow freely, and at the same time produce the desired action upon the slimes.

The two plates are near enough together to allow the coarse sands to flow along the bottom of the shaking table without being interrupted by the corrugations or projection of the upper one; but they overlap each other sufficiently so that all the slimes and lighter material which pass down the sluice will be violently forced against these corrugations as the table moves from side to side.

AN ELECTRIC SAWMILL.—An installation of wood-working machinery for Lord Rothschild has just been erected at Tring Park. The plant comprises bandsaw and circular saw machines for converting logs, deals, etc., as also planing, molding, mortising and tenoning machines, the whole of which are driven by electric motive force. The machinery has been supplied by Messrs. A. Ransome & Co., of Chelsea, and

erected under the superintendence of the resident engineer, Mr. C. Burman Callow. Although isolated machines have been driven by electricity, we believe this to be the first complete sawmill worked under these conditions.

Better Information for Stockholders.

The recent Hale & Norcross suit has had a good effect on Comstock mine management in several ways. This week, for instance, for the first time, the Hale & Norcross report properly conforms to the law by giving the battery assays and car sample assays, the amount of ore raised from each level, etc. Generally the more valuable information was reserved for the directors, or "insiders," while the stockholders had what amounted to nothing. It is understood that the Savage and Cons. California and Virginia mines will soon follow suit with more complete detailed weekly reports.

Under the new management of the Hale & Norcross, the percentages of value show up higher. The developments in the recent suit showed there was quite a difference in percentages of the battery assays given the public and the car sample assays given the directors.

There are several suits pending in which various directors in several companies are asked for \$1000 damages each for keeping back information the law says they should make public. If these suits are decided against these directors, one of them at least will have to hand over some \$10,000 and others smaller sums. The suits were commenced by Manuel Eyre, who was a stockholder in the respective mining companies.

This system by which the stockholders paid the bills and the insiders got the profits has been going on so long that many of these directors look upon it as a piece of effrontery for the stockholders to object. It was only persistency and determination on the part of a few men that started the crack in the system which will eventually break it up altogether. The directors will all be more careful to obey the laws in the future, whether they want to or not; for when men are liable in damages, and are watched, they are apt to be more honest than when they have everything their own way.

ELECTRICITY AND HOISTING MACHINERY.—At a meeting of the Royal Scottish Society of Arts, Edinburgh, Mr. John Ritchie, engineer, read a paper on the "Application of Electricity to Hoisting Machinery." The purpose of his paper, he said, was to show the advantage of electricity over the direct use of steam and other methods of transmitting power to cranes. The modern electromotor was a highly-efficient machine, and in transmitting power its efficiency rose as high as ninety per cent. In small installations, in which the dynamos were driven direct by steam engines, eighty per cent. of the useful effects of the steam engine was given out by the dynamo, and with a large and economical engine driving machinery in a workshop where the power expended on the dynamo would only be a fraction of the whole, the useful effect would be still greater—say eighty-five per cent.

The loss in transmission would not exceed two per cent. An ordinary steam crane did not show such an economical result. Dealing with the application of motors to derrick cranes, Mr. Ritchie said there were certain drawbacks to the use of the steam derrick which were in great measure connected with the boiler.

GIFT OF A FINE TELESCOPE.—S. H. Barrows of Claremont, in Pomona valley, and some unknown lady of large means in Ventura county, have presented the Pomona Congregational College with the largest and finest telescope in Southern California. The instrument cost \$8000 in Boston, and will cost \$1000 more to set up and make it ready for astronomical observations.

Plan of Coal Breaker.

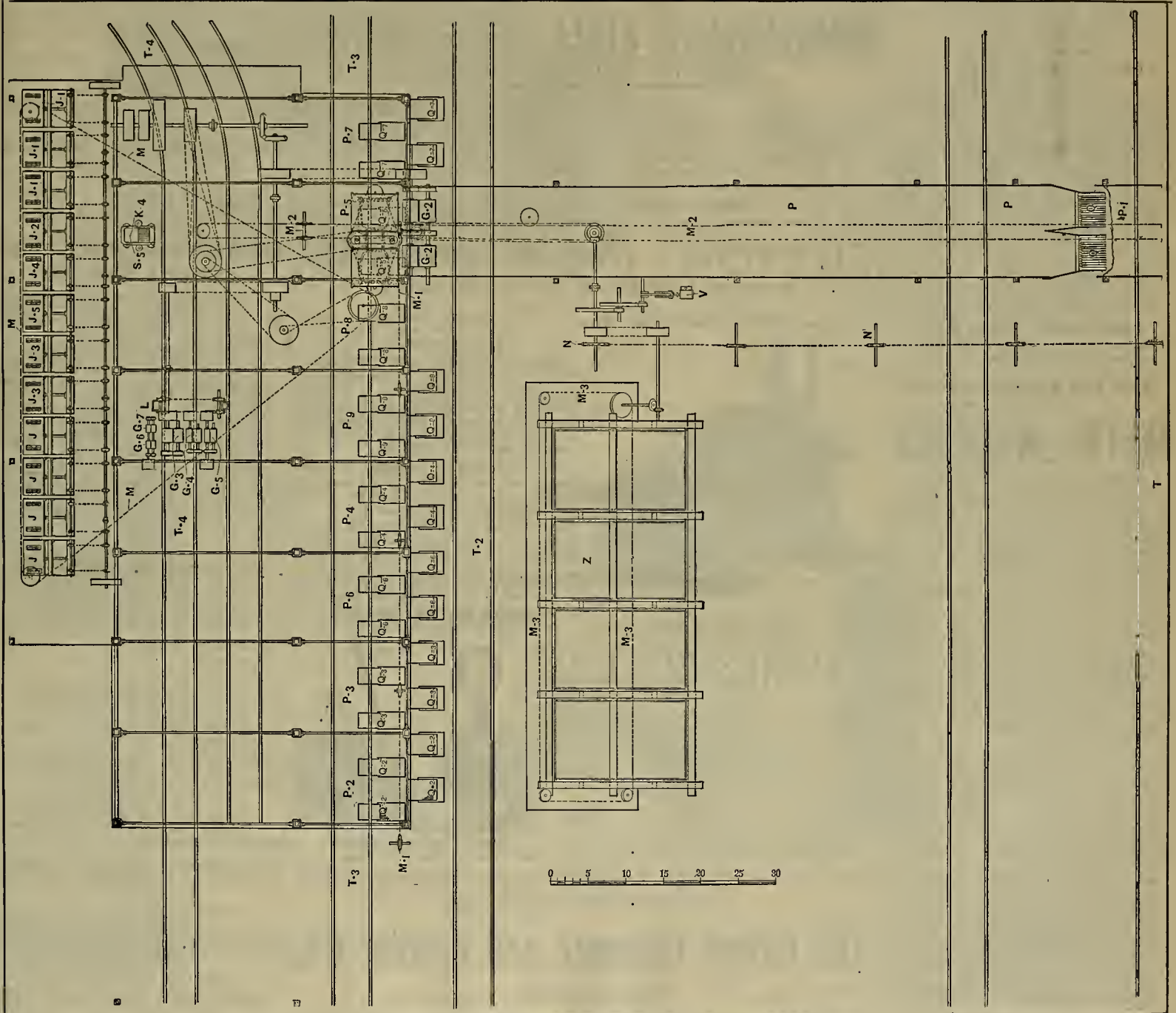
In recent numbers of the PRESS several illustrations have been given showing the methods of handling and sorting coal at the iron-breaker at Drifton. On this page is a ground plan of the breaker, showing the relative position of the pockets, lump-coal chute, the drags, mouths of pockets and loading tracks. Outside of the line of pockets there is an addition supported on one side by four cast-iron posts and on the other

pocket; P5, chestnut coal pocket; P6, pea coal pocket; P7, P8, P9, coal pockets for different sizes of chestnut coal; Q is the loading lip for the lump coal chute; Q2, for broken coal pocket; Q3, for egg coal pocket; Q4, for stove coal pocket; Q5, loading lip for chestnut coal; Q6, ditto for pea coal; Q7, Q8, Q9, for different sizes buckwheat; T is the lump coal loading track, and outside of that is the steamboat loading track; T2 is another outside loading track; T3, inside loading track; T4, reloading mine car

An English View of Our Tin Prospects.

While the prosperity of the metallurgical trades in America must necessarily have its reflex on this side of the Atlantic, the very reverse is the case with the important tinplate industry which manufacturers in the United States are bent upon establishing. It is evident that, if they succeed in supplying their own wants in tinplates, the depression which will fall upon the industry in South Wales will involve, in no small measure, one

they were justified in this attitude is clearly shown by the employment of Welch tinnmen, whom they soon found were alone capable, by their experience, of elevating the manufacture of tinplates to a "national" industry. It is creditably asserted that during the past year not one sheet of coke tins was put upon the market by American producers; and coke tins constitute more than one-half the entire requirements of the United States. The outturn of the American tinplate works was about one per cent of the whole consumption. This is not very encouraging, in view of the considerable efforts and expenditure of money which have been made



GROUND PLAN OF BREAKER FOR SORTING, SIZING AND CLEANING COAL.

by the western posts of the pockets, in which addition are arranged the twelve jigs, as shown in the accompanying general plan. The height of the breaker from the railroad track to the peak of the roof is 91½ feet; to the dump, 79 feet. The greatest amount of coal passed through and cleaned in the breaker is a little over 260 tons per hour.

In the plan J are the stove jigs; J1, chestnut jigs; J2, flat chestnut jig; J3, pea jigs; J4 and J5, buckwheat jigs; K4 is the gyrating, flat chestnut separator; G2, for steamboat coal; G3 is for the broken (slate coal); G4, egg; G5, stove; G6, chestnut; G7, flat chestnut rolls; M is the slate drag (jigs); M1, supplementary coal drag (from loading lips under pockets); M2, main coal drag; M3, dust drag (settling tank); N, slate conveyor; P is the lump coal chute; P1, steamboat chute; P2, broken coal pocket, P3, egg coal pocket; P4, stove coal

track; V is the slate drag engine; Z, settling tank.

Gold Ores of Shasta County.

SAN FRANCISCO, April 25, 1892.

TO THE EDITOR:—Your correspondent, "Boston," in his letter last week on the above subject, makes a mistake; also answers his own questions. The gold does not dissolve, but remains suspended in water; the fact that it can be recovered by settling, filtering, etc., proves this; also proves that the loss is mechanical and avoidable by a better system.

The MacArthur-Forrest process, intelligently applied, either to the slimes alone or to the entire ore, is a remedy for just such a case.

C. H. AARON.

THE people up around Puget Sound protested against United States war vessels coaling at the British ports, when domestic coal can be procured at Seattle; and the Acting Secretary of the Navy has issued an order that all naval vessels cruising in Puget sound shall get coal at the Sound ports.

branch, at least, of the mining interest. Fortunately, for the South Wales producers at least, the experiments that have been made in the United States during the past year have not been attended with success. It is found, it would seem, that the tinplate industry refuses to take root in any soil, however carefully it may have been prepared. A shrub from Cuba planted in the snows of Labrador could not have failed more completely than the tinplate industry taken from South Wales to America has so far done. It has been protected in every possible way, and sheltered from the withering blast of competition by the help of prohibitive duties; but, in spite of all this care, the tinplate industry is sickening nigh unto death. Failure was in the first place due to the determination of manufacturers to dispense with foreign labor. The industry was to be of purely national growth. How far

to put the industry upon a satisfactory basis. Nor is there much promise contained in the statement that the small outturn of tinplates in the United States could not be sold for the prices which the Welch makers, in spite of the high tariffs, were able to accept. It is not likely, however, that the American producers will give up in despair without making further serious efforts. They are trying to produce cheaply by making their plates thinner and lighter, and with a further view to economy, they are purchasing a number of Welsh patent tin pots, besides importing cold rolled pickled and annealed steel, of Nos. 29 and 30 gauges, cut to sizes ready for tinning. Tinplates produced under these conditions by Welsh workmen can hardly be called an American product, and it is exceedingly doubtful if they would allow of any considerable margin of profit to the manufacturer. What, however, is indisputable is the fact that the South Wales industry, with its low cost of production, is not likely to be permanently restricted by the competition of tin plates produced in America.—London Mining Journal.

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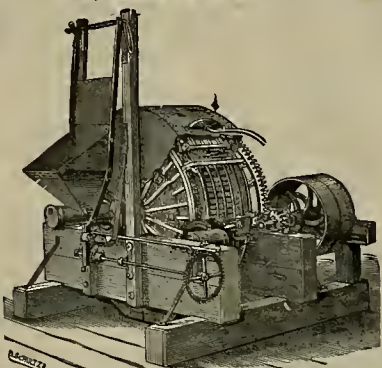
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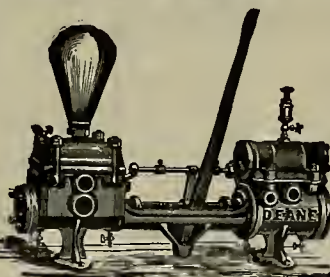
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, April 28, 1892.

While there is more or less croaking in certain branches of trade, yet there are unmistakable evidences that the volume of goods going out on orders, is larger than at this time in 1891. While trade is undoubtedly larger yet the profit is smaller owing to strong competition. Among iron workers there is generally an air of satisfaction. More orders are, as a rule, on hand, than at any one time for several years past. They are not so fearful of entering into contracts now, as they were for the past three years, owing to their not having fears of labor troubles before the work is finished. Cheap raw material is in their favor.

In the local money market a plethora of funds is reported. There is no marked call for money for speculative purposes or from any particular branch of trade. Eastern mail advices report money in over supply. The same condition obtains in the money markets abroad. To the unsettled condition of silver, it is now being acknowledged is largely due the general stagnation in all branches of trade and speculation throughout the civilized world.

QUICKSILVER—Receipts the past week aggregate 530 flasks and the exports 125 flasks sent to Mexico. The market is weak at \$12 per flask, with a rebate of \$7 for export.

MEXICAN DOLLARS—The market is dull and heavy at a round 69 3/4 cts.

SILVER—The market shows more strength notwithstanding a strong bear pressure abroad. The government has been longer in securing 4,000,000 ounces in this month than in any one month since the law went into effect. The extreme silence regarding the silver question at Washington taken in connection with silver buyers being organized in nearly all the States on this coast, is being accepted as evidence that himetalists are on a still hunt at Washington, looking to securing more favorable action in favor of free coinage. In Europe the silver question continues to attract attention. To the low and fluctuating price of silver is attributed many of the evils now afflicting trade in all parts of the world. It lessens the purchasing power of many nations, while it gives to moneyed men in gold standard nations the power to form combinations calculated to disorganize all branches of business and makes every thing operated in partake more of a speculative than of a legitimate character. The output of silver, it is said, is decreasing the world over owing to the low prices not admitting of profit to mine owners.

LIME—Receipts the past week aggregate 451 barrels. The market continues in buyers' favor.

BORAX—Receipts the past week aggregate 215 cents and exports by sea to New York 303 cents. The shipments overland to distribution centers at the East during the month drawing to a close will show a decided increase over the shipments during preceding months.

ANTIMONY—The market is fairly easy at quotations. Current quotations at New York are as follows: 10 1/2 cts for Hallet's, 12 1/2 cts for L. and 14 1/2 cts for Cookson's, and 13c for "Crown" brand.

LEAD—Corroders and other consumers of pig on this coast report an increased consumption. At the East the market is reported fairly firm, with a large consumption by corroders. Dealers do not look for any further improvement in prices.

TIN—Imports the past week aggregate 88,405 boxes of plate. The demand for plate is light. It is claimed that the consumption will show a decided falling off. In pig a corner is being run. English cables report a slow market for plate, with values settling to lower figures.

PIG IRON—The market is barely steady. It is claimed that concessions are obtainable on late asking prices. London cables report that stocks are decreasing. At the East, leading Southern furnaces are trying to combine so as to secure better prices for the future.

COPPER—There is nothing new to report. The consumption is steadily increasing. Eastern mail advices report an enlarging demand for wire bars. The New York *Iron Age* reports that the best part of 250,000 pounds have been taken at 12 1/2 cents for prompt delivery, while contracts involving June delivery were subsequently entered at 12 1/4 cents. The same paper says that this evidence of heavy consumption for electrical purposes is of more than ordinary significance, and, in connection with liberal use of the metal in other directions, gives tone to the market for Lake Superior product in the face of uncertainties connected with the alleged proposed international agreement for regulation of the world's production. The general impression is that there will be a livelier movement ere long and better prices, unless present indications as to consumptive requirements are greatly at fault. For the present, common casting brands are quoted at 11 1/2 cts @ 11 3/4 cts, and Arizona ingot at 11 3/4 cts, but consumers are shy in view of the close proximity of those prices to prevailing rates for Lake Superior ingot, and purchases are made only as imperative wants dictate.

COAL—Imports the past week are as follows: Tacoma 4700 tons, Seattle 3435, departure 2230, Baltimore 2900, total 12,255 tons. The market is reported to be showing more steadiness for cargoes in various positions. Unfavorable crop weather in the month just closing, if followed by dry and hot weather in June, will cause fewer ships to come to this port in search of outward wheat cargoes. With fewer ships coming, higher freights will have to be paid for coal shipments to this coast.

Eastern Metal Markets.

New York, April 27.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper	Lead	Tin
Thursday.....	40	87 1/2	11 3/4	4 25	20 50
Friday.....	40	1-16	87 1/2	11 3/4	4 25
Saturday.....	39 11-16	86 1/2	11 3/4	4 25	20 70
Sunday.....	39 11-16	86 1/2	11 3/4	4 25	20 70
Tuesday.....	39 13-16	86 1/2	11 3/4	4 25	20 70
Wednesday.....	39 7-8	87 1/2	11 3/4	4 25	20 70

Copper is very strong. Lead is firm. Tin is stiff at a slight advance. Quicksilver is weak. There is a continued good demand for borax. Pig iron appears to have a better tone.

Complimentary Samples.

Persons receiving this paper marked, are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

VERY rich mineral is reported from Little Belt district, Montana.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.....	14	English, D.....	19
Refined, in car lots.....	8	Canton tool.....	9
Powdered, do.....	8	3 1/2" diam'd tool.....	9
Concentrated, do.....	7 1/2	Pick & Hammer.....	9 1/2
All grades jobbing at advance.		Machinery.....	5
COPPER.		Toe Calk.....	4 1/2
Bolt.....	22	TIN PLATE.	
Sheathing.....	22	B. V. steel grade.....	6 00
Ingot, jobbing.....	14 1/2	14x20, spot.....	6 00
Do, wholesale.....	13 1/2	Charcoal, 14x20.....	6 00
Fire Box Sheets.....	24	Do roofing, 14x20.....	12 00
IRON.		Do, do, 22x23.....	12 00
Bar, base.....	3	PIG TIN.	
Norway, base.....	4 1/2	Spot @ B.....	23
PIG IRON.		COAL.	
Eglinton @ ton.....	25 00	SPY FROM YARD—PER TON.	
Glenbrook.....	25 00	Wellington.....	8 01
Ann. Rft., No. 1.....	25 00	Gretta.....	7 25
Oregon Pig.....	30 00	Nansaimo.....	7 25
Puget Sound.....	30 00	Gilman.....	6 50
Olay Lane White.....	24 00	Seattle.....	7 00
Langdon.....	25 50	Oous Bay.....	7 00
Thorncliffe.....	25 00	Cannel.....	8 50
Gartshore.....	25 00	Egg hard.....	14 00
Barrow.....	25 50	Oumberland, in sacks.....	15 00
Caronfeet.....	23 00	Do, bulk.....	14 00
CHROME IRON ORE.		Wallasey.....	7 50
Per ton.....	10 00	Scotch Splint.....	7 50
LEAD.		Brynho.....	7 60
Pig.....	4 1/2	West Hartley.....	8 00
Bar.....	5	TO LIMA—PER TON.	
Sheet.....	7	Australian.....	7 00
Pipe.....	6 1/2	Liverpool Steam.....	7 00
SILVER.		Scotch Splint.....	6 50
(Discount 10% on 500 bags.)		Cardiff.....	7 00
Drop, 3/4 bag.....	1 30	Lehigh Lump.....	12 00
Buck, 3/4 bag.....	2 00	Cumberland.....	13 00
Chilled.....	2 20	Egg hard.....	12 00
QUICKSILVER.		West Hartley.....	7 50
Home trade, pr.....	42	English, to load, \$8 00 @ 9 00	
Task.....	42	Do, spot, in bulk 10 00 @ 11 00	
For export.....	35	Do, in sacks.....	

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Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY.
Location of principal place of business, San Francisco, California; location of works, Silver Star Mining district, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 6th day of April, 1892, an assessment (No. 10) of Twenty five cents (25c) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 303 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 9th day of May, 1892, will be in default and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 31st day of May, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
FREDERICK K. DUBROW, Secretary.
Office—Room No. 69 Nevada block, No. 303 Montgomery St., San Francisco, California.

DELINQUENT SALE NOTICE.

KEYSTONE CONSOLIDATED MINING COMPANY.
Location of principal place of business, San Francisco, California; location of works, Amador City, Amador county, California.

Notice—The following are delinquent upon the following described stock, on account of Assessment (No. 2) levied on the 9th day of March, 1892, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Amount.
A. B. McCreery.....	8	2,334	\$5,836 00
A. B. McCreery.....	66	134	335 00
A. B. McCreery.....	57	533	1,332 50
A. B. McCreery.....	59	99	247 60
A. B. McCreery.....	114	60	250 00
John Clement.....	102	124	355 00
M. J. McDonald.....	129	260	600 00
M. J. McDonald.....	137	600	1,250 00
E. D. Rue, Trustee.....	133	925	2,312 50
Wm. Lettis Oliver.....	133	40	100 00

And in accordance with law, and an order of the Board of Directors, made on the 9th day of March, 1892, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, No. 310 Pine St., room 43, San Francisco, California, on MONDAY, the 9th day of May, 1892, at the hour of 12 o'clock M. of said day, to pay said delinquent Assessment thereon, together with costs of advertising and expense of sale.
J. H. ISHAM, Secretary.
Office, No. 310 Pine St., room 43, San Francisco, Cal.

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First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight rifles also save very fine sulphurets and the quicksiver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better belt than has ever been manufactured for use on this coast. It will last much longer and will handle fully one-third more pulp than any smooth belt, and will save a higher percentage of sulphurets.

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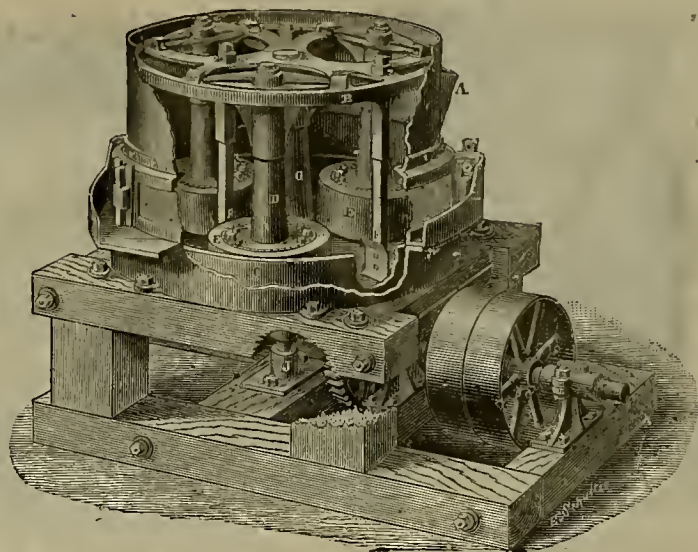
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The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to a very desired fineness by the centrifugal force of the rollers as they roll over it.

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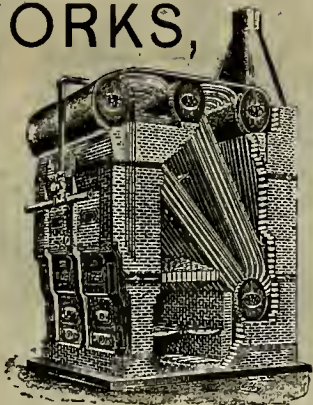
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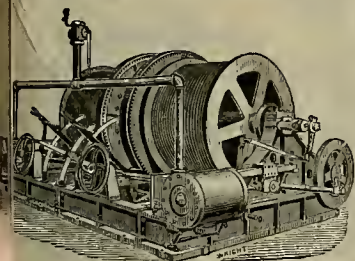
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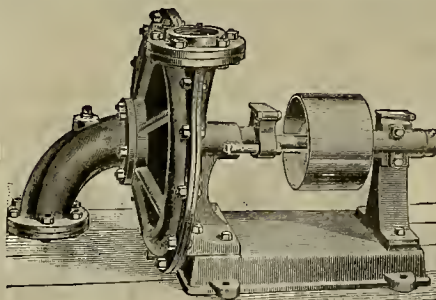
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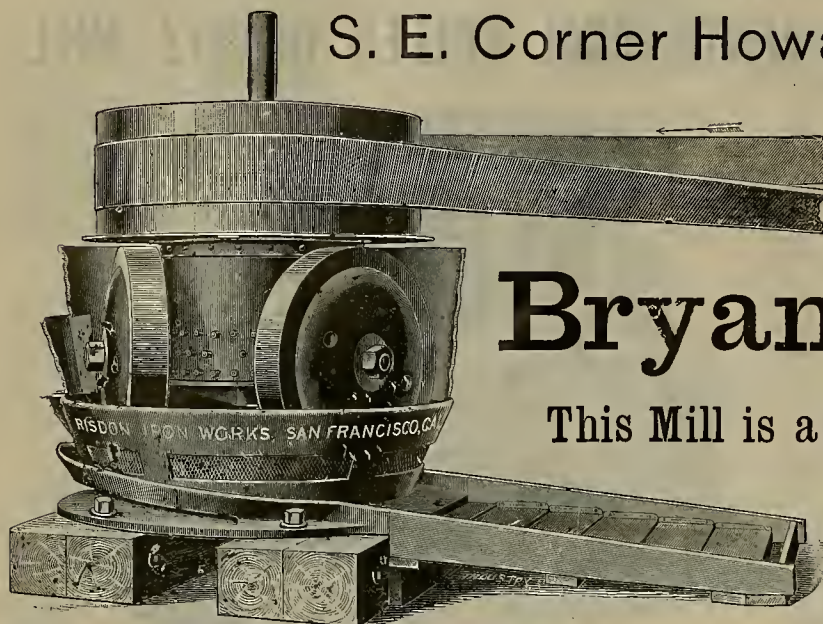
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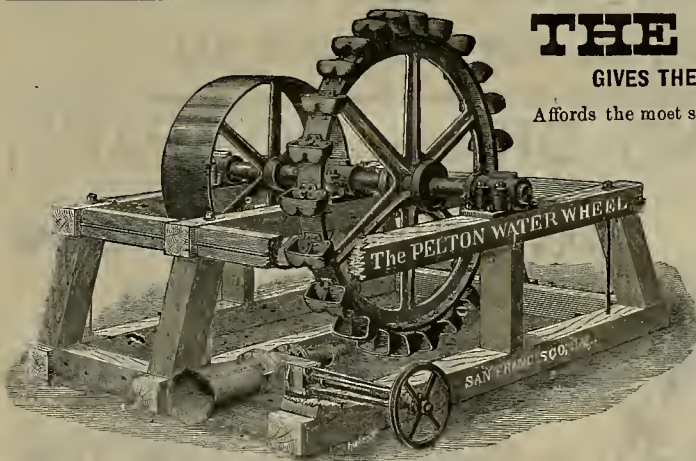
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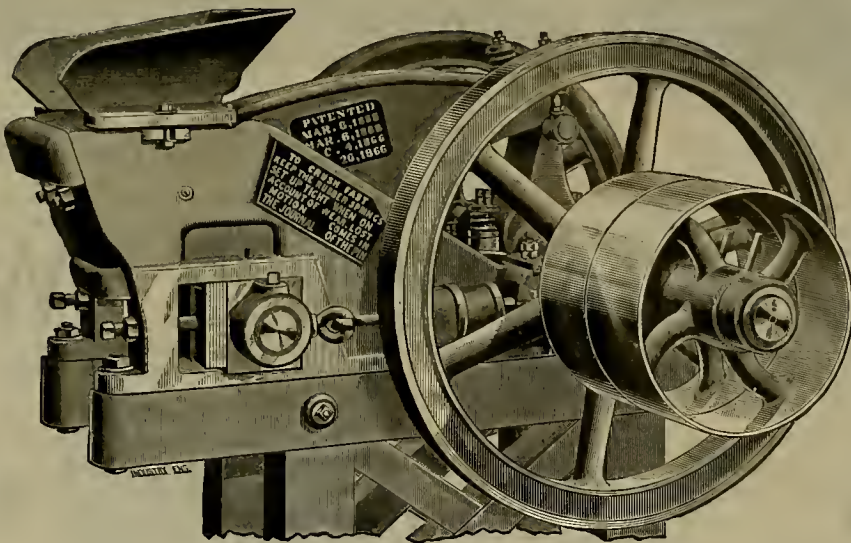
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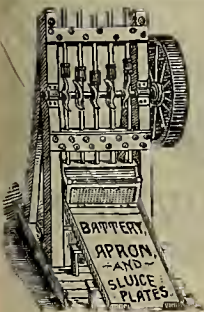
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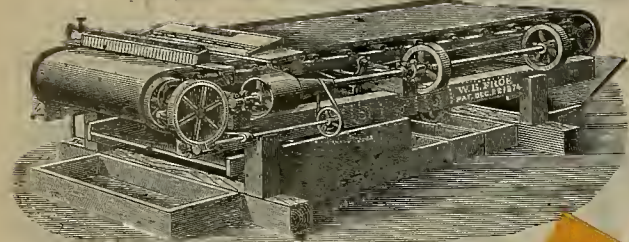


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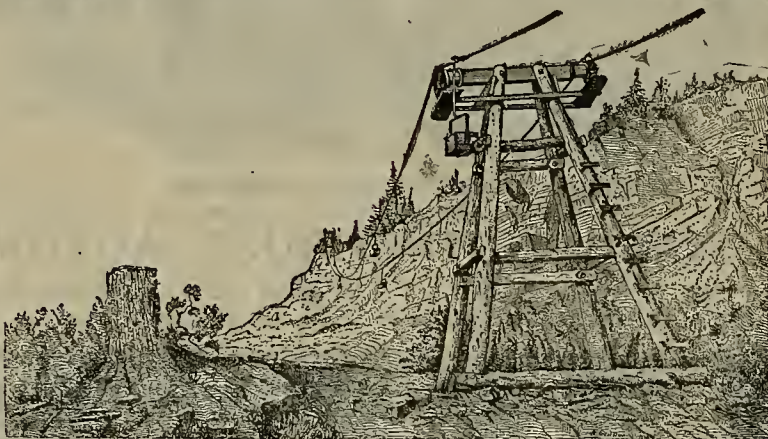
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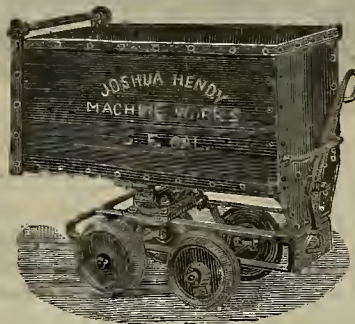
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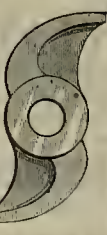
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An Illustrated Journal of Mining, Popular Science and General News.

OL LXIV. — Number 18. 19
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MAY 7, 1892.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

Gold Mining and Politics.

At the State convention of the Republican party at Stockton, this week, a Placer county miner was selected as chairman. Mr. H. Neff, who was chairman of the State Miners' convention, and is now president of the California Miners' Association, was chosen. In seconding his nomination, Mr. Murphy of Los Angeles, said: "We believe that every industry of the State should be protected and fostered, and with that view and overlooking our oranges and our fruits, we cast our eye to historical Placer, where the old '49ers made this country glorious once before, and Los Angeles greets Placer and seconds the nomination of Mr. Neff. Gentlemen, one word further before I sit down, so that we may know something of the sentiments that animate us. We believe that the mining interest of this State should be put upon its feet again. We believe that this can be done without destroying a single blade of grass, and to-day we not only second the nomination of Mr. Neff for the worth that is in the man, but we wish to say that the Republicans of Los Angeles county and the southern part of the State are in favor of lifting again to prominence the mining interests of this State, so that we can not only furnish the raisins

the world, the wine to the world, the wheat to the world, but that we can cut the cord that seems to worry the statesmen of our country to-day, and furnish the gold for the world."

One of the planks in the platform adopted by the convention is as follows: "We hail with glad hearts the cessation of legal warfare between the miners and the agriculturists of California, and the blending together of the two great interests of our commonwealth into one harmonious effort to advance the common good without injury to either. We indorse the efforts that have been made to bring farmer and miner into a union, and call upon Congress to enact immediately into laws such measures as will enable the hydraulic miner again to pour to the pathway of commerce his millions of treasure from the streams of the Sierra Nevada without damage to the valleys or to the agricultural interests of the State,

so that the busy hum of labor and the music of the school shall be heard in the now deserted mining camps of California, as in days of old."

While the MINING AND SCIENTIFIC PRESS, as a technical journal, has no special interest in political affairs, except as they influence the industrial features which it represents, it must congratulate the miners of California on the action of this convention. This action is but another indication of the great change of feeling which has taken place in the past few years on the mining question. Within two years the Legislature of the State has adopted resolu-

platform, such as appears in this case, did the former prejudice against the industry exist to-day. This is really another step in advance for the miners' cause, and one upon which they can congratulate themselves.

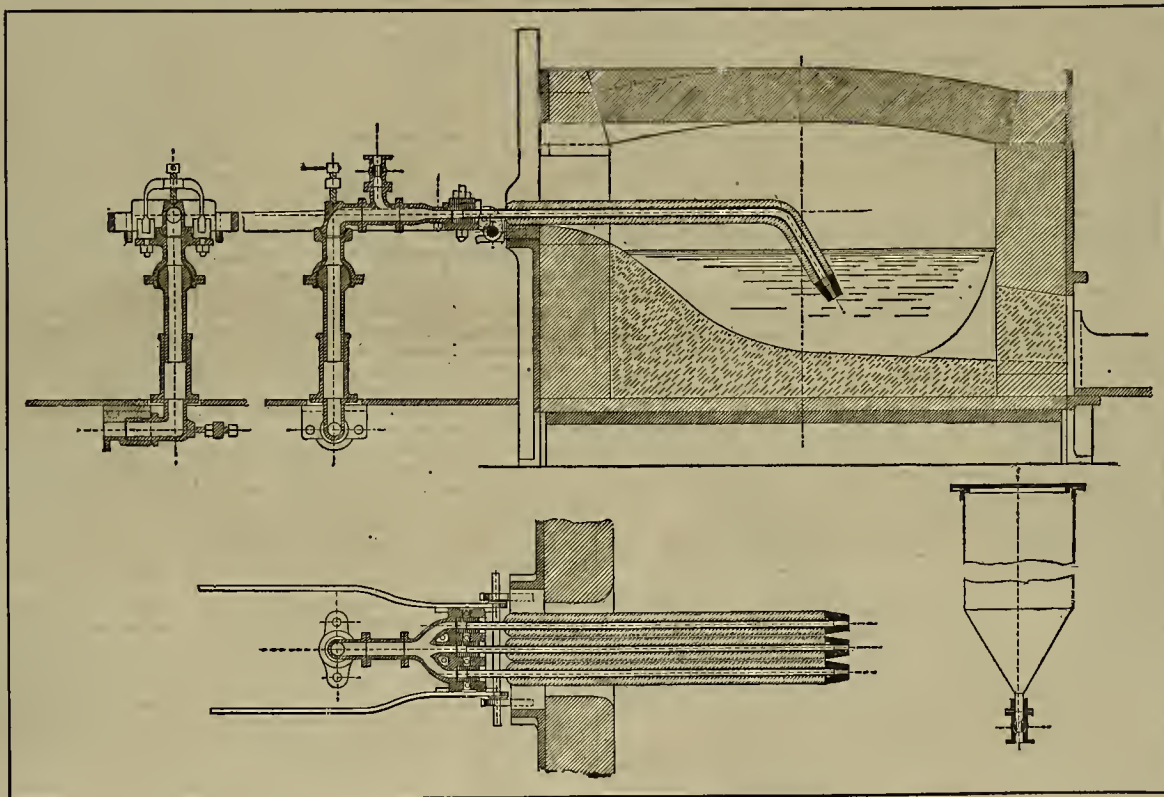
Open Hearth Metal.

The manufacture of ingot iron in the open hearth furnace is generally conducted in Germany by the Martin process, in which the pig iron is decarbonized by malleable scraps, commonly the crop ends and rejections of the mill's own productions. The regular pig-and-ore or Siemens proc-

The Mechanical Engineers.

The American Society of Mechanical Engineers holds its annual meeting this year in San Francisco for the first time. These meetings have been held in the principal Eastern cities, where the members of the society have been cordially greeted and entertained. The society has a membership of some 1400, embracing most of the prominent engineers of this country and abroad; men who are and have been connected with our greatest industrial enterprises. They are men of wide acquaintance and connection, able to influence the

opinion of thousands at the East. They come here to examine our public works and industries, and represent millions of capital invested in works of all kinds. Their visit here is the most important of the kind that has occurred, and must have a lasting influence upon our industrial interests. The sessions of the society will be held at the Academy of Sciences hall from the 16th to the 19th of May, inclusive. As their time will not all be taken up, during the day, the local mechanical engineers intend showing them what there is to be seen in and around the city. They must be received and entertained in accordance with the proverbial liberality of this city. Our industrial and com-



APPARATUS FOR INJECTING AIR INTO OPEN-HEARTH METAL BATH.

tions favorable to the hydraulic mining industry; the Governor of the State has officially favored it; the San Francisco Chamber of Commerce, Board of Trade and Board of Supervisors have lent it a helping hand, and the various counties of the State have given aid. Congress has taken the subject up and committees have reported favorably on bills to rehabilitate the industry. The politicians recognize the fact that the tide is in favor, and that the people and the press want to see a rehabilitation of gravel mining, since it is shown this can be done without the injury complained of in the past.

It is pretty certain that neither this nor the convention of any other party would have chosen as its chairman a man holding the relation to the mining community that Mr. Neff does were the mining industry in the position it was five years ago. Neither would a plank have been inserted in the

ess finds application only in isolated cases and to a very small extent. The practice of blowing air into the metal, which was used for some time in the Phoenix works at Ruhrort, required a special apparatus, found to be perfectly practicable, though the economic advantages could not be demonstrated. This apparatus is shown in the cuts on this page, as is the funnel for use with coal dust. The process is as frequently acid as basic; the latter method, however, is continually gaining ground, and it is especially interesting to observe that such works in particular as aim at only a small output, or have but small quantities of scrap to work up, prefer the basic process. To such an extent is this true that even in ordinary machine shops and foundries 1.5 and 2 ton open hearths are found in successful operation.

THE pressure in the natural gas well at Ogden, Utah, is very strong indeed.

mercial firms are asked to contribute to a fund now being prepared, and Mr. George C. Hickox has been authorized to collect subscriptions for this purpose.

In the construction of all sorts of machines and works, this body of men takes the most prominent part. There are members eminent in every branch of mechanical design. No such important body has ever come to this coast before. The various committees to assist in their entertainment will be selected this week, it being intended to apportion the work among the gentlemen connected with the various industrial enterprises of the city.

Thus far during the season about 80 men have started into the Yukon country from Juneau, Alaska. For the past six or seven years these diggings have attracted considerable attention, and from present indications will develop into a profitable field for the prospector.

Mining in Nevada.

Why It Does Not Prosper—Defects in the Laws.

The mining industry could be benefited by limiting the quantity of mineral land locatable, simplifying the method of acquiring title and requiring actual occupation and use as a condition to ownership. Prior to 1866, it was the settled policy of the United States to reserve the land bearing precious metals from sale. No other individual could acquire the fee title to the mineral lands. They remained public property, subject to the public control. The right to mine was a mere license suffered by the Government—a privilege which ceased when the individual enjoying it abandoned his work. The holding and working of mines was governed by the local rules and customs of miners adopted in district meetings and applicable to each locality. It was the object of these "local laws and customs" and the policy of the Government to encourage mining and enforce equality of rights; to secure to each miner actually residing in the district the possession of as much placer ground as he could reasonably work, and as much ledge or mineral-bearing rock as he could properly develop.

BUT ONE LOCATION

Could be made by the same individual on the same "lode." Each locator was required to personally "represent" his claim, and no location was valid which was not "represented" and worked in good faith. Placer claims rarely exceeded 50 feet in length, and were sometimes restricted to 15. Ledge locations were confined to the lode, and varied from 20 to 200 feet along the course of the vein. Under this system thousands of men were sometimes seen in a single gulch, each working his separate claim for his own account, and thousands of locators were often engaged in prospecting and developing a single lode. Thus,

SPECULATION IN MINES

Was restricted, legitimate mining encouraged, and employment given and wealth distributed among many people. In 1866, Congress changed the policy before existing, so far at least as related to the title to "lodes." It was then enacted that "The mineral lands of the public domain are declared free and open to exploration and occupation by all citizens of the United States and those who have declared their intention to become citizens."

It was also enacted "That whenever any person or association of persons claim a vein or lode, * * * having previously occupied and improved the same according to the local customs or rules of miners in the district where the same is situated, and having expended, in actual labor and improvements thereon, an amount of not less than one thousand dollars * * * it shall * * * be lawful for such claimant * * * to enter said tract and receive a patent therefor."

This act conferred the license of the Government to go upon the public land, search for minerals and appropriate them when found. It also conferred the right to

ACQUIRE THE TITLE BY PATENT

To a lode upon compliance with the local customs of miners and expending one thousand dollars in labor or improvements. The act of 1866 provided that "no location * * * shall exceed 200 feet in length * * * for each locator, with an additional claim for discovery to the discoverer of the lode;" and "that no person may make more than one location on the same lode, and not more than three thousand feet shall be taken in any one claim by any association of persons." But in 1872 the policy which had therefore prevailed of selling the mineral lands to actual miners in small claims, was completely reversed. It was then enacted "that a mining claim * * * whether located by one or more persons may equal but shall not exceed fifteen hundred feet along the vein or lode," and "three hundred feet on each side of the middle of the vein at the surface."

NO LIMITATION

Was put upon the number of locations of fifteen hundred feet each. An individual or association could make and one individual could acquire the patent title to as many claims as he desired the patent, carrying not only the ledge located but "all ledges * * * the top or apex of which lies inside of such surface lines."

Placer claims are "subject to entry and patent under like circumstances and conditions * * * as are provided for vein or lode claims." Thus every limit which the policy of the Government from its foundation had put upon the acquisition of the public mineral lands was swept away and the mines—placer and quartz—turned over

to speculators and monopolies. A single person or corporation can now locate and hold an entire gulch or mineral belt, and by doing the "assessment work" prevent any real mining being done. Patents can be obtained to an unlimited extent of ledges or placer ground, and thereafter the land held free of taxes, free of assessment work and free of development.

THE EVILS OF THIS SYSTEM

Are transparent and flagrant, the injury inflicted upon mining incalculable. In some localities, extensive placer regions are held by single corporations, and the precious metals, which should contribute to the prosperity of many, flow into the coffers of a few. In some mineral belts the ledges for miles in extent are located by a single individual. No actual mining is done. In many cases the annual work is not performed, but the claims are relocated from year to year. In every district locations are held without any intention to mine them. Thousands of claims have been patented, upon which no mining is done, and which have not been occupied for years. Many of these claims are acquired and held with no intention to work them, but with the hope that they may be made valuable by the industry of others in developments made on adjacent ground. Idlers and speculators are thus encouraged and profited; prospectors and miners deterred from making developments, and a blight put upon the prosperity of the whole State. The defects which I have pointed out in the mining laws should be remedied without delay, and the mining industry

RELIEVED OF THE IMPEDIMENTS

The law casts in the way. The quantity of land locatable and purchasable by one person should be limited, and but one location allowed to the same person on the same ledge. All locations should be plainly marked on the surface, and a written notice, accurately describing the claim, should be posted at the center and recorded on the land records of the county in which the claim is situated. Title should pass to the locator upon proof of location and occupation and payment of the price of the land; application to purchase should be made without unreasonable delay, or the location forfeited. A claim, whether held by patent or location merely, not actually occupied and mined in good faith, should be abandoned after the lapse of a reasonable time, and open to relocation. No locator should be permitted to twice locate the same ground. Above all, the law should be simple, certain and uniform in its operation, leaving as little as possible to construction and nothing to district rules. In short, the mineral lands should be held for legitimate miners; the right to locate and purchase, and extent of location, should be limited; those who claim the lands should be required to mine them; those who do not intend to mine should not be permitted to obstruct those who do.—Robert M. Clarke, in Reno Gazette.

Points in Testing Granite.

A very important point to ascertain in comparing results of experiments of different kinds of granite is whether all the materials under experiment are actually granites. It is not near enough, even for practical purposes, to admit other kinds of stones, simply because they may be known in the market as "granites," into the comparison.

The results of resistance to thrusting stress are of no real value unless stones of approximately similar mineralogical composition are tested. For instance, granite should be compared with granite, syenite with syenite, greenstone with greenstone, and so on. This leads to the conclusion that, in respect to granites, the crushing weights on six-inch cubes are useful only for comparison of the finer-grained varieties, and any one who is selecting stone should therefore know the grain of the rocks, the results of compression of which he is comparing.

It is often found useful to know the weight of stones, because to a certain extent it is an index to their durability. Many published results show the average weight per cubic foot, while others give the specific gravity. The trouble of preparing several samples of hard stones, making them of the required size and shape, in order to find their average weight, is a drawback to the former method. The latter method is, perhaps, the preferable one, for not only can the stones be of irregular shape, but when an average piece is carefully selected, more accurate results are obtained.

The specific gravity of a substance is its weight compared with that of an equivalent bulk of pure water, at a definite temperature and pressure. The density of a rock or mineral depends, to a great extent, on chemical composition and minute structure.

The stone to be weighed must be an

average-looking specimen, because two fragments of the same rock may contain different proportions of its constituent minerals.

The most convenient way of finding specific gravity is by weighing the same specimen first in air, then immersed in water, and dividing the former weight by its excess above the latter.—Geo. F. Harris in Stone.

Mexican Mining Laws.

The new mining law promised in the presidential message is finished, and will be presented to the Chamber at once. The law enables the consolidation of mining property and the leveling of it to the position of ordinary real estate, the only restriction being the payment of an annual tax.

The renoucement of the mine system now used, obtains for the miners the right of encroachment which, according to the old Spanish law, allowed mine owners when following the working of a vein to cross or even work on strange property.

The law also, in place of restricting the formation of mining companies, provides for the free working of mines, mortgaging them, if need be; in fact it provides for all that tends to facilitate the investing of capital, and for the granting of all kinds of securities; thus simplifying the possession necessary to secure formalities of and to work mines.

Track laying on the Southern Railway is proceeding rapidly. Rails for the Inter-Oceanic Railway have arrived and track laying on the extension from Matamoros toward the Pacific has commenced. A mining exchange is to be established at the City of Mexico.

THE GARBERVILLE OIL WELLS.—P. J. Wood, now of Garberville, who was a resident of Sonoma county when Mendocino county was included in its boundaries, is now visiting John McMinn of this city. Mr. Wood removed to the south fork of Eel river in 1860, and was the first settler in or near the present site of the town of Garberville. He has secured a very large range near that place, and has it stocked with cattle, sheep and horses. When Mr. Wood first went to the South Fork, the Indians were numerous and hostile, and he joined the soldiers as a volunteer in the troubles with them in 1862-63. There is considerable interest in that section in oil wells. A company is organized, and at work there, known as the Humboldt Oil Company. It has spent several thousand dollars in boring apparatus, and has gone down between 500 and 600 feet. It struck oil at a depth of 400 feet, but was going deeper in expectation of a larger supply. It is equipped to go to a depth of 2000 or 3000 feet if necessary. The oil is said to be of very superior quality, much above the average of any oil yet found in this country. The company is working quite a large force. The members are all Eastern men, and have had much experience in the business. They regard it as the best indication on the Pacific Coast.—Sonoma Democrat.

GOLD SHIPMENTS.—A dispatch from New York, dated April 22d, says: Landenberg, Thallman & Co. have ordered \$255,000 in gold coin for shipment to Europe to-morrow. Lazard Freres have ordered \$1,250,000 gold for export to-morrow. The total to-day is \$1,505,000. In regard to the orders for nearly \$2,000,000 gold for export to-day, the *Post* says: A new movement of gold to Europe will begin to-morrow, and the occasion for the movement is probably the same as in the case of the February exports; that is to say, the gold is either to be sent to Austria or to be held in other financial centers to replace gold already forwarded. Whether Vienna's operations are the sole basis for the orders is not so certain. The largest shippers by to-morrow's steamers are the bankers who managed last year the heavy gold exports to France. These bankers did not participate to any extent in the February shipments, which went chiefly to England and Germany. To-morrow's exports go almost entirely to Paris, and the bankers admit that the movement will continue for some time. In itself the export of gold at this season of the year is too familiar a spectacle to excite remark, but it is interesting to observe that the current rates for exchange, like the rates under which last year's gold went out, are below the level of profit on ordinary shipments.

SAW FOR NICKEL-STEEL.—Last week there was placed in the Homestead Steel Works of Carnegie, Phipps & Co., Limited, at Homestead, Pa., an important piece of machinery of which there is no duplicate in the United States. It is a steel saw weighing 110 tons to cut nickel-steel armor plate. These armor plates range in weight from 8

to 38 tons, and reach a length of 20 feet and a thickness of 20 inches. The saw has a blade 7½ feet in diameter, geared above and revolving horizontally. The armor plate when about to be sheared is placed on a tilting-table, which is adjustable to any angle, and presented to the edge of the saw, endwise. The forward motion of the carrying-table thrusts the plates steadily against the flying teeth, and an angular slab of cold nickle-steel weighing several tons is removed in much the same manner as the end is taken off a pine log in a sawmill. It is to be used also for cutting plates into any desired dimensions. This machine was imported from Germany and is said to have cost about \$35,000.—Iron Age.

Patent Interferences.

The report of the Commissioner of Patents is an admirable piece of work, but there are two of his recommendations for legislation which we cannot pass by without condemnation. One of the most revolutionary changes which he suggests is that of transferring interference proceedings from the patent office to the courts. We urge against this change the consideration that the courts are overburdened already. There is little room for doubt that the delays in the prosecution of interferences, delays which are now often avoidable, would then become necessary, so that patents would issue still further away from the dates of application. It sometimes happens under present conditions that applications are held in interference for as many as ten years. Under the proposed plan, we might expect such a state of things much more frequently. Do inventors want any legislation which will tend to delay the issuance of patents?

But, above all, do inventors want such dilatory legislation, coupled with penalties under which they, the irresponsible and unwilling parties, are to suffer? Yet, this is what would follow, if the commissioner's recommendations were to be carried out in their entirety, for he advocates in connection with the above measure the passage of a law which shall limit the life of a patent in all cases to no more than twenty years from the date of application. We can fancy the impotent rage of an inventor just emerging from the vexatious delays of a long interference on finding that his patent has only twelve years, say, to run.

A bill embodying Commissioner Simonds' recommendation has been introduced in Congress, and we are informed that inventors all over the country have been invited to signify their approval of the measure. We advise inventors to be very careful how they give their approval of the two clauses referred to in the foregoing. The other recommendations are all good and desirable, but we are convinced that to secure the passage of these two clauses would be jumping out of the frying-pan into the fire.—Electric Power.

The Big Telescope for Mt. Wilson.

Hon. E. F. Spence has been seen by a Los Angeles *Herald* reporter relative to the statement from President Eliot of Harvard College, referring to the plan of establishing an astronomical observatory on the top of Mt. Wilson. It was suggested in the article mentioned, that it would be well if Mr. Spence and President Eliot could come to an understanding and consolidate their plans, producing one grand observatory, which would excel anything of the kind elsewhere.

"I am perfectly willing to unite with Harvard," said Mr. Spence, "but I want the University of Southern California to receive some credit in the matter, for it was to the university that I gave the endowment for the forty-inch glass. The observatory should be the most complete in the world, it should be one where every one, from the man who carries the hod to the scholar, could have an opportunity of observing the wonders that God has put into the heavens. It may be that the plans of both Harvard and the local university can be combined; if so, I shall be very glad."

"The great lens, the first of the two which make together the forty-inch glass, is all safe in the shop of Alvan Clark's Sons in Cambridge. The second lens was being constructed in Paris recently by Mantois, and while it was in the furnace, it exploded into a thousand pieces. This so upset Mantois that he left Paris and disappeared for six weeks, when he returned and commenced work again. This second glass is, comparatively speaking, easy to make; the first one was the most difficult to make, and that is all right. We might have waited 40 years before getting such successful results as we did."

The Colorado Silver League.

An Address to the Wealth-Producing Voters of the Nation.

The Colorado State Silver League, on behalf of an army of Colorado voters, sends greeting:

We have undertaken a great work in your behalf as well as in our own, and it is to secure your active cooperation in that work that we come to you with this earnest appeal. We have common interests, and those interests have a common foe. It is for the laudable purpose of asserting and maintaining our rights that we are banded together. Will you not join us?

In consequence of one deliberate, cowardly blow, dealt by the hand of organized avarice, we have for years been groveling at the feet of insolent, unscrupulous money-changers, whose openly avowed purpose it has been and is to control and contract the world's volume of circulating money.

With that end in view was the demonization of silver accomplished. The foul means which were used to achieve that purpose are too well understood to require discussion here.

The disastrous effects of that iniquitous scheme have been felt by each one of us. To-day they are plainly visible on every hand, in the depreciated value of almost every commodity produced by the labor of human hands, and especially in the ruinous prices of wheat, cotton and silver, as well as in the constantly falling prices of agricultural lands, mines and labor. The distress and suffering which it has bred throughout the nation is beyond the power of the human mind to compute.

Year after year we have gone regularly to the polls and persistently fought each other, while working for the supremacy of one or the other of the two great political parties instead of standing shoulder to shoulder to meet and resist the attacks of one common enemy. Those parties, as they exist at present, deem the spoils of office of paramount importance to the welfare of the people. They are maintained chiefly for the benefit of self-seeking politicians, whose most lofty ambition is paltry office. To attain that end they do not hesitate to persistently betray the interests of the people whose aid they solicit into the hands of the money power. They are partisans for revenue only. At the bidding of this same money power, they have placed the General Government on a level with the stock broker; they have rendered thousands of families homeless; they have changed the toiling debtor into a cringing mendicant, and from the ranks of toiling labor they have recruited an army of tramps.

If a traveler was ever robbed on the highway, then the silver miners of our country—loyal, patriotic citizens—are now being robbed by the General Government at the rate of \$20,000,000 a year. If, then, the silver miners have just cause for complaint, what shall we say of the cotton growers of the South, who lose more than four times that amount annually; or of the wheat growers of the North and West, who year after year have filched from their earnings more than five times the annual loss of the silver miners? Figures grow bewildering. But if the miners, planters and farmers have suffered a loss that the human mind cannot comprehend, what shall we say of the 2,000,000 of idle laborers? Not less than twenty-four millions a week is the loss of the wage earners, the producers of wealth.

In the face of these exasperating outrages, what use have we for political parties—so long as those parties are dominated by the people's unscrupulous foe?

The people have complained, and their complaints have been met by sneers; they have murmured, and their murmurs have encountered derision.

We are now fully convinced that further submission to these grievances is simply to bare our backs to the lash of insatiate greed. Yes, it would be to pursue a course unworthy of Americans, and unworthy of the manhood which we boast.

There are, at this time, in the State of Colorado upwards of 40 nonpartisan silver clubs, and the number is daily increasing. They have an aggregate membership of over 20,000 voters. Each member, upon joining, pledges himself in writing that until this question shall be settled, and silver restored to its rightful position in the money of the nation, he will vote for no candidate for any important position who is not fully committed to the remonetization of silver. In addition to this, representatives of these various clubs assembled in the city of Denver and perfected the organization of a State Silver League. They also issued a call for a State Silver Convention—to assemble in this city on the 25th of April, prox.—upon a basis of representation from the various county and local organizations.

This organization, however, asks no member to forsake his party affiliations until the forthcoming National Convention shall have neglected or refused to comply with our request for the nomination of a free coinage candidate for the presidency, on a free coinage platform. With that end in view, we urge the most perfect county and precinct organization. We urge the most faithful and diligent attention to the primaries, to the end that the County and State Conventions may not be controlled by professional politicians. We urge that the delegations to the National Conventions shall be composed of the very best men that the respective parties of our State can produce, always giving due notice, however, that no candidate whom such National Convention shall nominate shall receive our support at the polls unless he shall unqualifiedly favor the full remonetization of silver, and shall stand squarely on a free coinage platform.

We further urge that Colorado delegations to the National Conventions shall make it a point to confer with the delegates from all of the other Western and Southern States, who should represent the wealth producers instead of the money power, to join them in caucus, to the end that they may act as a unit in making their demands and representing the sentiments of the voters of their respective States and Territories.

And finally, we urge upon each individual member of our organization to regard his written pledge as absolutely sacred, and to be faithfully redeemed at the polls in November next, even to the support of a third party candidate for the presidency, should such a course be necessary.

Now, we come to you, and respectfully but earnestly urge your hearty and prompt cooperation in this great work. We ask you to organize at once. Organize silver clubs in every city, town, village or mining camp, yes, in every neighborhood. Let county and State organizations follow immediately after. Organize at once in order to do effective work at the primaries—both Republican and Democratic—to the end that your voices may unite with ours, and that our combined influence may be felt at both Minneapolis and Chicago. If the hitherto Republican States west of the Missouri river will but enter into this work with the same spirit that pervades the voters of Colorado, we will present a force at Minneapolis that will at least command respect. Remember that the vote of these States is absolutely necessary to the life of the party. Then, if the voters of the new South will, on their part, enter as heartily into the work, they can accomplish quite as much, if not more, at Chicago.

Only last month the commercial price of silver fell below 90 cents an ounce—the lowest price reached in the history of the world. From that point it has constantly and rapidly fallen until, at this writing, it is worth but 85 cents an ounce, and the finger of the oppressor still points downward.

For that reason, mines are being closed, miners' wages are being reduced, and in many instances they are being discharged.

Within the ranks of this class, then, the force of this appeal will be felt. But the business man will be brought to a realizing sense of the situation in very short order. Business stagnation is inevitable. The farmer will plant and reap, but his crops will rot on his hands, or be sold at a price far below the cost of production. More laborers will be out of employment.

Now, look around you, and judge for yourselves whether or not this appeal is timely.

Politicians tell you that "the tariff is the leading issue." The tariff, like the poor, is always with us. We assert that silver is the issue. Forty millions of the American people demand its immediate remonetization.

Shall we continue to act at cross purposes, or shall we join hands for the common good?

By order of the State Executive Committee.

M. H. SLATER, Chairman, Denver.

J. H. ERNEST WATERS, Telluride.

ARCHIE C. FISK, Denver.

HENRY PAUL, Aspen.

W. C. WYNKOOP, Denver.

NEW FRENCH IRONCLAD.—A new French battleship, to be called the *Masena*, is to be at once laid down at the building-yard of the Societe des Chantiers de la Loire, and, according to the terms of the contract, is to be completed within five years. The plans have been prepared by Mons. du Bussy, who has designed all the most recent French ironclads. The principal dimensions of the vessel will be: Length, 363 4 feet; breadth, 65.6 feet; draught of water aft, 26.2 feet; displacement, 11,700 tons. There will be three screws driven by engines which, with 16 boilers, will develop under forced draught a maximum of 11,000 horse power, and a speed of 18 knots. There will be a com-

plete water line belt of armor of a maximum thickness of 17.7 inches. The armament according to the *Times*, will be composed as follows: Two 11.8-inch guns, one forward and the other aft, in covered sponson barbettes; two 10.6-inch guns in covered sponson barbettes, one on each broadside; eight 5.5-inch quick-firing guns in sponsons, four being on each broadside; four smaller quick-firing guns of 3.3 inch (20-pounders) four of 2.6-inch (9 pounders) and twelve 1.8-inch (3-pounders), and ten Hotchkiss revolving cannon of 1.46-inch (1-pounder). The vessel will have four torpedo ejectors, two forward and two aft, and will be the first ship in the French navy to be provided with submerged tubes. A sister ship to the *Masena* will be laid down later in the year.

CAVIAR.—Caviar, which is made from the eggs of the sturgeon, is an important article of exportation for many cities of Russia and Astrakhan, and principally Taganrok. The annual amount is estimated at 40,000 poods (1 pood = 36 pounds). The greater part goes to Turkey, Greece, Italy, and Germany, very little to England and still less to France. The fisheries are situated at the mouth of the Volga, upon the banks of which stand vast storehouses with basements and cellars in which are found the tubs that contain the brine used in the preparation of caviar. The most profitable fishing is done in autumn, this season yielding the largest quantity of eggs. In winter, the fishermen make large holes in the ice and fish with the spear. At all other times they use nets, about 300 feet in length, to which are attached cords provided with hooks. Each of these is strong enough to hold a fish of large dimensions. Each establishment owns a fleet of boats. The fishes brought on board are laid upon boards and covered with salt, and are then opened for the purpose of extracting the eggs and the entrails, which the Russians are very fond of, and which they eat in a fresh state. For exportation, caviar is prepared in two different ways: 1. The eggs are washed and then immersed in strong brine for three-quarters of an hour and finally allowed to drain. In this way "granular" caviar is obtained. 2. For "compact" caviar, the eggs are first cleansed, then pickled and finally allowed to dry slowly. Then they are packed closely in canvas bags which are inclosed in wooden barrels, after which they are ready for shipment. A ruder process, but one much used in the trade, consists in immersing the eggs, immediately after collection, in brine, wherein they are left for several months, after which they are dried in the sun.—*La Nature*.

NIAGARA FALLS POWER.—The *Manufacturers' Gazette* says: It is stated that the commissioners of the Queen Victoria Niagara Falls Park have given their consent to the introduction of a bill to the Ontario Legislature, which will create the Canadian Niagara Power Company. This company will retain the exclusive right to develop the power of the cataract on the Canadian side of the river, under an irrevocable license. The company will be capitalized at \$3,000,000, and includes many men who are identified with the most prominent in American business circles. The company will pay \$25,000 rental per annum for the first decade, the rent to be computed from the first day of the approaching May, and it has been agreed by the commissioners to accept the first two years rent in two payments of \$15,000 and \$35,000 each. The rental for the second 10 years increases \$1000 each year, until at the close of 20 years it is \$35,000, at which rate it will be continued. The company undertakes to begin work on or before May 1, 1897, and to proceed so far that on November 1, 1898, it will have completed water connections for the development of 25,000 horse power, and has actually ready for use and transmission 10,000-horse power.

SODA.—That soda barrel is good for lots of things besides cleaning files; whenever a lot of greasy repair work comes along, such as boxes to be babbited, bolts and nuts to be tinkered up, just put them in the soda barrel, boil ten minutes, rinse a little with hot water, and the work will be as free from grease as if such a thing never existed. When the oil stone gets filled with oil, a boil in the soda barrel will take out all the grease, and make the stone cut much faster. The overalls that are full of grease and dirt can be cleaned in a short time by boiling in the soda, but it will not do to use the strong solution for this business, or the cloth will be dissolved as well as the grease. Take one quart of the strong solution, put it in two pails of water, and boil the clothing in that. Usually it will do the business. If it does not, add a little more strong soda and try again.—*Blacksmith and Wheelwright*.

THE ORIGIN OF THE WORD "CALICO."—In the year 1489, just ten months and two days after leaving the port at Lisbon, Vasco da Gama landed on the coast of Malabar, at Calicut, or, more properly, Khale Rhoda, "City of the Black Goddess." Calicut was at that time not only a very ancient seaport, but an extensive territory, which, stretching along the western coast of Southern India, reached from Bombay and the adjacent islands to Cape Comorin. It was at an early period so famous for its weaving and dyeing of cotton cloth that its name became identified with the manufactured fabric, hence the name calico. It is now generally admitted that this ingenious art originated in India, in remote ages, and from that country found its way into Egypt. It was not until the middle of the seventeenth century that calico printing was introduced into Europe. A knowledge of the art was acquired by some of the servants of the Dutch East India Company and carried to Holland, whence it was introduced in London in the year 1676. It is surprising for grown-up children, as well as our young folks, to learn that "Pliny, as early as the first century, mentions in his natural history that there existed in Egypt a wonderful method of dying white cloth." Calico cannot be despised when it boasts of such antiquity. The shoddy make-up of the present day may look down with contempt upon the calico dress, but "what kind of lineage has it?" the calico can proudly ask.—*Draper's Record*.

MCCLOUD RIVER PLATEAU.—The construction of the railroad to tap the immense pine forests of the McCloud river plateau, south of Mt. Shasta, will be begun at once. The right of way for building the line up the Soda creek canyon has finally been secured, and the first section of the road, 2.1 miles long from its junction with the main line at Castle Crag Tavern at the mouth of Soda creek, will be built immediately by the Southern Pacific Company. The road is to be built to this point by the Southern Pacific Company under a contract between the company and Tatum & Bowen of this city and miller and Brewster of Wisconsin. The lumber people will erect their first sawmill at the terminus of the first section, and will then continue the construction of the line through 28 miles of forests of immense pines, the whole to be completed by September 1st of this year. At convenient intervals along the line sawmills will be set up.

SATISFACTORY TEST.—A test of 100 tons of ore from the Hale & Norcross mine crushed at the Occidental mill is completed, and 80 per cent of the battery pulp assay value was returned in bullion, notwithstanding that the grade of ore was very low, averaging only \$15 per ton. This is fully 20 per cent more than bullion returns secured from much higher grade Hale & Norcross ore crushed at the Nevada mill under the former management of that mine. Then less than 60 per cent pulp assay value was returned in bullion. This very satisfactory test will result in the Hale & Norcross company leasing the Occidental mill, which has an ore-crushing capacity of 70 tons in 24 hours. The lease will specify that sulphurets concentrated from ore tailings escaping from the amalgamating pans will belong to the Hale & Norcross shareholders.

A DISINFECTANT.—Nitrous acid as a disinfectant had been proposed some years ago because of its peculiar property of being an oxidizing as well as a reducing agent. H. Borntrager employs the following combination containing 20 per cent sodium nitrate: One part sodium nitrate and one part gypsum are melted together; after cooling the mass is powdered and preserved in well-stoppered receptacles. Two parts sodium bisulphate and one part gypsum are also melted together and, after cooling, powdered. Both powders are now mixed and preserved in dry and tightly-stoppered containers. If this powder be thrown into water or substances to be disinfected, a uniform evolution of nitrous acid takes place, which rapidly destroys foul odors.—*Pharm. Centralhalle*.

FRICTION IN RIFLES.—In consequence of the enormous initial velocity of the bullet in the new Mannlicher rifle, and the resulting friction and wear on the barrel, it has become necessary to devise some method preventing both of these evils. The manager of the Government Laboratory at Thun, Switzerland, has consequently devised a method of enclosing the leaden bullet in a thin metallic covering, while over this he places a wrapper of specially prepared oleaginous paper, which reduces the wear of the rifle barrel to a minimum, without interfering with the course of the bullet.—*Manufacturers' Gazette*.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

DYNAMITE AT THE HECTOR.—Cor. Amador Leager, April 30: One of the most dastardly outrages ever committed in this county was perpetrated about half past 10 o'clock on Friday night, at the Hector mill. To form a clear idea of the mischief wrought, it will be necessary to briefly explain the situation at the mill. The rock which supplies the mill is from surface cuts, and the loaded cars from the ore body reach the mill nearly on a level with the ground floor. It has, therefore to be raised up some 20 feet to the dump which supplies the feeders. For this purpose an elevator, operated by water power, has been in use, and has worked to a charm. This elevator was one point of attack. Then again the large pipe, which supplies the mine with water power, branches into two separate pipes 100 feet or so in front of the mill, one pipe running the hoist, and the other the mill machinery. This point of junction was the second place of attack. At the hour above named, some malicious scoundrel stole around the mill and dropped down the cylinder of the elevator two or more giant powder cartridges with not less than 25 feet of fuse attached thereto. He then hurried to the junction of the pipes, and laid another cartridge thereon, with ample supply of fuse to enable him to get at a distance from the scene of operations, if necessary, before the explosion. The reports were about one minute apart, and were very different from ordinary blasting, and awoke a number of the sleeping inhabitants. The elevator was completely demolished, the large castings being blown into fragments. The pipe was also destroyed at the junction place.

GOVEA.—Ledge April 30: A large cave occurred at the Gove mine during the night of April 17th. Some rich ore was being taken from the 700 level, and whether, in the excavation of this rock, the work of timbering was not kept up as closely as it should have been, we are unable to say. At any rate, an immense cave occurred, involving the ground between the 700 and 600 levels. Fortunately, no one was at work there at the time, and consequently no one was injured. The cave puts a veto upon the extraction of the rich ore, until such time as a new tunnel can be opened up into it.

MISCELLANEOUS.—The shaft of the South Eureka is down 520 feet. It is the intention to sink 10 feet more, to make a sump of 30 feet, after which drifting for the ledge at the 500-foot level will be commenced. The indications are very flattering for the opening up of a valuable property. It is reported that the control of the Plymouth consolidated has passed out of the hands of Hayward & Hobart to the New York stockholders. If so, the property will likely be started up again soon under the new regime. Albert Brown is opening up a chrome mine in the neighborhood of Finn's ranch, below Drytown. Chrome or chromium is a metallic substance largely used in the coloring of glassware and the printing of fabrics. None of the mineral has been shipped as yet, but there is a considerable body of it, and it may turn out an important and valuable property. Dr. Bardeue is in Jackson looking after his interest in the milling of the black metal at the Amador Queen. The crushing is almost completed. The percentage of sulphurets is heavy, from five to six per cent, but the yield in free gold is not yet determined. At the Kennedy, the system of water pipes has been materially extended. The Zeile mine had over 130 names on its pay roll last month. It is by far the heaviest employer of labor in the county.

Calaveras.

S. S. VALLEY MINES.—Calaveras Citizen, April 30: The Pine Log mill is crushing very good ore from the mine. A new shaft is to be started on the Park and Bulger mine soon; considerable prospecting is being done on the numerous claims in the vicinity. The Justice mine is being prospected by an old veteran prospector of 40 years' experience in quartz, who has uncovered an immense body of ore, extensive in width and length, and prospecting well in free gold. Judge Keane of San Andreas is one of the fortunate owners.

El Dorado.

HARMON.—Mt. Democrat, April 30: At the Harmon mine, work has been suspended, at least for the present. Tests made recently did not give returns such as to justify further development, hence the suspension. At the Gentle Annie mine they are still taking out ore that runs high, and the prospects are that this low-grade mine will develop into a high-grade property.

DALMATIA.—W. H. Husbands, Supt. of the Dalmatia mine, returned from England two weeks ago to-day, in response to a telegram to him while in London announcing the rich strike in the Dalmatia. After his arrival he panned out over 70 ounces of gold in two days. Some of the specimens are declared to be dazzling in their beauty. The proprietors are to be congratulated that the strike occurs simultaneously with the extensive improvements under way at this mine.

Humboldt.

KLAMATH AND SALMON.—Blue Lake Advocate, April 30: M. L. Welch came down this week from the mining section of Northern Humboldt and Northwestern Trinity. Mr. Welch has been as far on the Klamath as Happy Camp, and as far up the Salmon as Sawyer's Bar. Mining matters at Happy Camp are quiet. Only a couple of Chinese companies are doing anything there. At Orleans a number of mines are in operation and are paying fairly

well. The big mine of the English syndicate is idle. Nothing has been done by its owners for development of it since the ditch broke two years ago. Prospecting at Sawyer's Bar has resulted in the location of several new claims, besides, a wagon road to connect with Etina is in course of construction, which is expected to be a great convenience. It will give the people of Sawyer's Bar continuous wagon road to Yreka and Redding.

WILLOW CREEK NOTES.—Blue Lake Advocate, April 27: C. S. Little came down Tuesday from the mining section on Willow creek, where he has a claim. He informs us that the Van Vecker party who passed through Blue Lake on Friday of last week, en route to the mines on Willow creek to locate a ditch, is still there, and will probably stay some little time yet. Confidence is now shaken in the belief that there is gold in paying quantities all along the creek, and that only capital is needed to develop the mines there. Miners believe the bonding of the mines and the consequent expenditure of some thousands of dollars in their development will be a good thing not only for the syndicate, but for the county at large. It has been generally supposed that mining there would be confined to operations in the bed of the stream, but Mr. Little says that a paying lead or two have lately been discovered on sand bars 10 and 15 feet above the present creek bed.

Lassen.

A GYPSUM MINE.—Lassen Advocate, April 28: From James Elledge, who came up from Amedee yesterday, we learn that he has unearthed the croppings of a fine gypsum ledge in the Cottonwood mountains, about 50 miles south-east from Amedee. He made the discovery some time ago, but because of his inability to judge correctly of the extent and quality of the ledge, he refrained from making the matter public. Last week, however, he, in company with lower county capitalists, repaired to the scene, and remained long enough to form a correct idea of the merits of the find. There are surface croppings, he says, covering a space of about 40 feet, and on examination it was found that a ledge about six feet wide was leading from these croppings into the mountain sides. The capitalists who were viewing the scene were very enthusiastic over the affair, and no doubt Jim will realize a good thing out of his mine. Gypsum is a very useful material, and if this find is properly utilized, it will be a good thing for this part of the country.

Nevada.

CENTENNIAL.—Grass Valley Telegraph, April 29: The Centennial Mining Co. operating on Osborn Hill is about to resume work. Last summer fine hoisting works were erected on this property, and the incline shaft cleaned out and retimbered down to the water level. All this work was done in that first-class manner for which Supt. Stoddard is noted. During the past few months the mine has been idle, owing to the inclemency of the weather. Now that the spring time is upon us, many new enterprises are about to go ahead, and among them is the Centennial. It is proposed to erect a five-stamp mill and begin active work early next month.

A DIVIDEND.—Herald, April 28: The Omaha Gold Mining Co. of Grass Valley has declared its sixth dividend of 15 cents a share. The mine looks well.

WASHINGTON MINAS.—Things are brightening up at Washington. There have been several good strikes lately which are very encouraging. We hear to-day of a new strike in gravel, but can get no particulars yet. Williamson and Cole have struck a big thing in their quartz claim, and everybody is talking about it. We know of at least one new mill to be built this summer, and possibly a second one. Taken altogether, Washington district bids fair to have a good season.

BRUNSWICK.—Grass Valley Telegraph, April 30: To-day, Major Fitzgerald brought to town some very superior milling ore, which was taken from the ledge in the 600 level of the Brunswick mine. The ledge at the point from where the rock came is about 14 inches thick. The quartz shown us to-day has plenty of sulphurets in it and shows gold all through. The Brunswick is being systematically and carefully worked.

MOUNT GEORGE.—The Mount George mining claim is situated on Rush creek, near where that stream empties into the South Yuba river. The claim is near the Yuba bridge, on the new road to North San Juan, and is about two miles and a half west of Nevada City. This claim was owned by George Joseph, who is now deceased. Friday evening the claim was sold by the administrator in the Joseph estate to E. L. Goldsone, John E. Carter, Fred. Zeldner and Dr. W. C. Jones. This ledge has not been prospected to any great extent, as the shaft is down only about 30 feet. Yet, several thousands of dollars worth of gold has been taken out of that shallow shaft. The new owners propose to prospect the claim thoroughly and will begin sinking the shaft deeper in a few days. There is a Pelton wheel on the claim that runs a light hoisting gear.

Placer.

DUTCH FLAT.—Cor. Auburn Republican, April 29: Will Runkel has struck it rich in his mine about one mile above the mouth of Humboldt canyon. He brought in some rock last week, and it is as fine as any that has ever been seen here. The ledge is three feet wide, and has been traced far enough to satisfy Mr. Runkel and expert miners who have seen the ledge that it is something permanent. Plenty of free gold can be seen, and some of the rock in which no gold could be seen has assayed \$30 per ton. J. E. Doolittle is a partner in the rich find, and they will commence at once to put it in proper shape for working.

Plumas.

A RICH PROPERTY.—Bulletin, April 28: The Homestake mine at Granite Basin, recently

purchased of Mr. Swan by Horace Waldron, is developing into a very rich mining property. During the past winter Mr. Waldron has been doing development work and extracting ore. The tunnel from the west side is now in 200 feet, with a ledge 18 inches wide and backs 60 feet high. The ore is of high grade. With 130 tons of ore on the dump, and such a fine showing in the face of the tunnel, Mr. Waldron is confident of a fortune. He will fit up his small mill to begin crushing soon, but hopes to erect a ten-stamp mill with such reduction works as will save all the gold.

GENESSEE.—Cor. Plumas National, April 25: The mill at the Grass mine was started up last week, having been bung up but a few days. A good deal of ore is being taken from the surface of a ledge in the North Hill. Mr. Knox is foreman of that part of the mine. Mr. George Brown, "tell George," has a contract, and is getting out timbers for the mine. Most of the mines on Grizzly creek have commenced work for the season. I am informed that Dean & Co. will commence work at the old Peel diggings in a few days. Mr. Sipes is getting some very good ore from the old waste dump of the Green ledge. Work at the McDonald mine is rapidly progressing under the direction of Mr. George Sanger.

San Bernardino.

NEW MILL OF THE NEEDLES CO.—Needles Eye, April 27: Last Friday will long be remembered by the good citizens of the Needles as the day which, in all human probability, marked a new era in the mining industries of this section of Southern California. The occasion was the trial work of the new mill of the Needles Reduction Co., and it goes without saying that the trial was perfectly satisfactory. To make the occasion more impressive, Pres. Isaac E. Blake of Denver, Colorado, accompanied by Mrs. Blake and their little son, Vice-Pres. Purdy of the Chicago, Rock Island and Pacific railroad, Miss Fanny Purdy, Mr. Ferguson, a Denver banker, Mr. Crosby, a New York capitalist, and a large concourse of Needles people, and miners from the neighboring mountains, all assembled at the mill Friday afternoon at 3 o'clock, to witness the interesting first work. As soon as the steam was turned on and the machinery started, Mr. Morgan, the superintendent, placed the first sack of ore near the bopper of the crusher and gallantly handed Miss Fanny Purdy a shovel, with which she accomplished and graceful daughter of the Rock Island's popular vice-president fed the contents of the sack to the crusher. Twelve sacks of ore were thus fed, and in a very short space of time were ground up to a fine powder. The ore was from Dan O'Leary's up-the-river mine, and the rock was pronounced the hardest and most difficult to crush that the mill will have to handle in this section. Yet the crushing process was complete and highly satisfactory.

CARLISLE.—Cor. Times-Index, April 30: W. H. Alesworth came in from the Carlisle mine last Monday and reports good progress in the work of developing, they having gone down 40 feet on the ledge, and find the vein widening, as it starts in on the surface about 1½ feet wide and is now 31 feet wide. The rock assayed from \$22 to \$185 per ton on the surface croppings. Mr. Alesworth thinks it will not assay quite as high on the 40-foot level, but thinks it rich enough to keep developing, and will go down to 60 feet, when he will run a drift 1500 feet long on either side of the shaft, and, if the ore holds out as good as indicated at present, will put up a mill on the mine and open up a camp there. The mine belongs to S. G. Burt, an old prospector in that country, and is situated about three miles east of the Virginia Dale mill. McKee & Alesworth, two practical mining men of Los Angeles, received an option on the claim and are developing it. John Wilson, another old prospector in the Twenty-nine Palm country, was in Banning last Monday and reports the Twenty-nine Palm Mining and Milling Company making good progress on the mill they are erecting at Twenty-nine Palms. They are putting up a Byran mill equal in size to an eight-stamp mill, and will have it in running order about June 15th or July 1st, when they will run from eight to ten tons of rock through the mill per day. They propose to work eight men in the mine and three men in the mill, which is located in the best place on the desert for a mill, there being an abundance of splendid water near at hand and wood within a few miles, and the mines they propose working are all above the mill, giving a downhill pull to the mill with the loads of ore; but they are making a grand mistake in not putting in concentrators, as they can save only the free-milling ore with the process they are going to employ. This is what has caused the Virginia Dale mine to be unprofitable, for the assays made of the quartz show that the precious metal is there in paying quantities, and the fact that it is unprofitable to run the mill is prima facie evidence that there is a loss of gold somewhere in the milling, and this is where it is.

Siskiyou.

TO DAIRY.—Siskiyou Telegraph, April 30: J. O. Whitney, Supt. of the Scott River Mill, Ditch and Mining Co., was in Yreka last Monday. Mr. Whitney informed a Telegraph representative that the company had abandoned the idea of extending their ditch any farther up the river, as they intend to turn their hydraulic mine into a drift mine, as a more convenient mode of getting at the pay gravel where the bank is so very high. This is the mine in which millionaire H. H. Warner of Rochester, N. Y., is interested.

RICH PAX.—The Bellerat mine is working day and night, and has very good indications of finding rich pay on the bedrock. The amount of water which they have to contend with is phenomenal, and it is necessary to keep the pump going almost constantly. Power for pumping purposes is furnished by a large threshing engine. There has been an immense amount of work done on this mine, and the

shaft is now down to a depth exceeding 80 feet from the surface. An important discovery was recently made at the Spencer mine on Humboldt. A 3-foot ledge, carrying free gold, was discovered in one of the lower levels of the old shaft, and at a depth of 240 feet. This new vein is said to be exceedingly rich.

Sonoma.

LEOPARD.—Healdsburg Tribune, April 30: Work at the Leopard mine, situated 18 miles west of Healdsburg, is progressing very rapidly. The tunnel which is being bored already reaches a depth of 175 feet, and the rich ledge of gold and silver ore is expected to be struck at any time. As soon as the vein is reached a 10-stamp mill, smelter, etc., will be expected, and the mine will be operated with heavy forces. The owners are well pleased with the prospects and believe they will strike it rich.

Tuolumne.

WORKING GRAVEL.—Sonoma Independent, April 30: A. R. Vining of Oakland, who leased the Peoria gravel mine at Mountain Pass, intends to work the same by means of a recently patented machine for the treatment of auriferous gravel. It will handle, it is said, about 3000 cubic yards per diem, and save every microscopic portion of the finest flour gold, as the gold is passed through quicksilver 400 times under pressure. The gravel is fed to the machine by a powerful steel shovel. The plant is said to cost about \$50,000.

Ventura.

IN THE OIL FIELDS.—Ventura Free Press, April 30: The increasing activity in oil matters in this county leads to the belief with many that the industry will soon exceed in value all other products in the county. Hitherto the wells have principally been confined to a section above Santa Paula, but lately considerable stir has been made in the vicinity of Nordhoff on the Ojai. Eventually, oil will be found in many places on the Ojai and its tributary canyons, and possibly may lead to direct benefits to this city in the way of repositories and refineries being built. A great many people venture the opinion that oil will be found well down the canyon, or within three or four miles of Ventura. Every barrel of oil taken out is just that much revenue to the county.

EXTENSIVE OIL WORK.—The Union Oil Co. has completed the third successful well on the Frank Robertson hill at Bardsdale, the flow being about 40 barrels per day. At least two more wells will be sunk on the hill, and then they will move down into the valley and drill. An extensive pumping station is being constructed from which all the hill wells will be pumped. It is reported another company is on the field, and leasing for oil and mining purposes is lively. Mrs. Randolph and William Horton leased their lands this week.

NEW OIL WELLS.—From H. A. Clayton it is learned that a Los Angeles company has leased his land, close to Nordhoff, for oil purposes. Four wells will be sunk at once. There is favorable prospect for a good flow of oil on the land.

ANOTHER BIG OIL STRIKE.—Fillmore is in luck again. On Saturday a 60 barrel a day well was struck on Frank Robinson's place next to Brice Grimes. The depth was 415 feet, and it took but 12 days to put the well down.

NEVADA.

Washoe District.

CON. CAL. AND VA. MINE.—1100 level.—From the end of the drift running south from the top of the upraise, 73 feet above the sill floor, which was carried up from the mouth of the west crosscut No. 3 from the main south drift, 310 feet south from the shaft station, the west crosscut has been extended 23 feet; total length, 43 feet, continuing in vein porphyry, with fine lines of quartz of low assay value. 1500 level.—From the south drift at point of connection with the old stopes we continue to extract some ore and fillings of average milling value. From the upraise which was carried up from the end of the crosscut run west 36 feet in from the main south drift, 155 feet south from the shaft station, we have continued to work upward and to extract ore of fair quality. 1600 level.—We have continued prospecting upward from the old sill floor of the old stopes, from which some ore has been extracted. 1650 level.—Have completed repairs to upraise carried up 59 feet above the southwest drift, and are prospecting west from the upraise 35 feet above the sill floor. Ore of fair quality has been extracted from the drift run east from the winze No. 3 (down 73 feet) in working upward from that point. From the north end of the California ground on the west side are working in the old stopes and extracting therefrom some ore of fair quality. 1750 level.—In east crosscuts No. 1 and No. 3 from the main south drift have continued to extract some milling ore. 1800 level.—Along the south end of the drift running south from the crosscut run east from the winze No. 1 sunk from the 1750 level we have continued to extract ore, from the sill floor upward, of milling value. From the drift run north from the same east crosscut, at a point 60 feet north from that crosscut, are putting in square set of timbers and extracting some milling ore therefrom. There have been extracted from all parts of the mine during the week 1284 1600-2000 tons of ore, which were shipped to the Eureka mill. The average assay value of the ore worked at the Eureka mill during the week, 1525 tons, was \$10.10; bullion shipped to the Carson Mint, assay value, \$18,445.15.

OPHR.—1465 level.—From the mouth of the north drift, from the drift run west from the winze 122 feet below the sill floor of the 1300 level, have continued our work in an easterly direction and extracted some ore therefrom. There have been raised to the surface during the week 26 tons of ore, the average assay value of which is \$22.50 per ton.

HALE & NORCROSS.—On the 900 level upraise

above this level, on our north line, extended five feet and connected with the Savage ore stopes. Have started to stope ore south of our north line above and below the point of connection. Winze from this level near our north line is sunk 15 feet; bottom in quartz, clay and porphyry. Hoisted 93 cars of ore from this level for the week. 1100 level—Are extracting ore from above and below this level. The stopes continue about the same as at last report. East crosscut on this level advanced 35 feet, through porphyry showing streaks of quartz. The quartz in fact to-day yields low assays. From this level, hoisted 184 cars of ore during the week. 1450 level—This stope yielded 75 cars of ore during the week. Have men on repairs where needed in the mine, and are doing some prospecting. Shipped to Brunswick mill during the week 433 1440-2000 tons of ore. Average of railroad car samples, \$19.49 per ton. Average of battery assay for the week, \$14.71 per ton.

MEXICAN.—On the 1465 level from the south drift from the crosscut running east from the bottom of the winze at a point 77 feet in, a west crosscut has been started and advanced 29 feet in quartz formation showing an average assay value of \$6 per ton. The face of the crosscut is showing a mixture of porphyry and quartz.

UTAH.—The west drift from the shaft station, 340 level, has been extended a total length of 602 feet. At this point passed through little quartz and clay and cut into west country rock. From the west crosscut, at a point 595 feet from the shaft, a north drift has been started and advanced 20 feet in vein porphyry formation.

SIERRA NAYADA.—The joint Sierra Nevada and Union west drift from the shaft, 900 level, is extended during the week 32 feet, making its total distance west of shaft 1900 feet; face in clay and porphyry. The Union east crosscut near south line from south lateral drift, 1570 feet west of shaft, 900 level, has been advanced 16 feet, making a total distance of 81 feet; face in porphyry.

BULLION.—The east crosscut, 350 feet south of north line, 1300 level, is out 107 feet; last 54 feet in quartz that give low assays.

CON. NEW YORK.—The north drift from the raise above 650 level is out 58 feet; face in quartz, some of which yields low assays.

ALPHA.—During the week have been retimbering the joint southwest drift from the 1800 level of the Ward shaft.

EXOHUECA.—During the week have been retimbering the joint southwest drift from the 1800 level of the Ward shaft.

SILVER HILL.—The north drift from the Justice shaft, 490 level, is out 600 feet; face in gypsum and quartz.

BEST ANN BELCHER.—900 level—East crosscut No. 1 has been advanced 20 feet; total length, 104 feet; face in porphyry. West crosscut No. 1 has been advanced 16 feet through porphyry; total length, 24 feet.

GOULD & CURRY.—200 level—Northwest drift, 435 feet west of shaft, has been advanced 20 feet; total length, 234 feet; face in porphyry. 400 level—At a point in northwest drift from west crosscut No. 1 started an east crosscut in quartz, clay and porphyry, and extended same 15 feet. Also did considerable repairing on the 309 and 400 levels. On the Sutor tunnel level the joint north drift with the Savage Company was advanced 25 feet; total length, 404 feet.

OCCIDENTAL.—The west crosscut from the south drift, 400 level, is in 84 feet, still showing stringers of pay ore. Have started to drift north on one of the seams showing in same crosscut. Have extracted about 40 tons of good ore from the drift started north from bottom of winze on 450 level. The drift started south from west crosscut on 550 level is in 14 feet, showing bunches of pay ore. West crosscut No. 2 on 750 level is in 25 feet; face in low-grade quartz.

ANNES.—On the 420 level west crosscut No. 1 from north drift on east side of the ledge advanced 7 feet and stopped in hard porphyry. From this west crosscut a north drift has been started 80 feet from the face and extended during the week 12 feet; formation, porphyry. West crosscut No. 3 from north drift on east side of the ledge advanced 12 feet; face in quartz and porphyry. Eased timbers in main north drift and repaired drain.

POROSI.—The winze is down 215 feet h-low the 1500 level; bottom in quartz which gives low assays. Potosi and Bullion west crosscut on south line, 1500 level, is out 162 feet; face in porphyry. Extracted and sent to mill in the past week 372 600-2000 tons of ore from the 930, 1100, 1150 and 1200 levels. Milled during the week 405 tons; on hand at mill, 100 500-2000 tons; average battery assay, \$21.82. Are repairing the joint northwest drift from the 1800 level of the Ward shaft.

CEOLLAR.—Are repairing on the 450 and 750 levels. The east crosscut on 1610 level, 150 feet south of north line, is out 84 feet; face in porphyry. Have resumed work in the south drift, on 640 level, which is now in 166 feet; face in soft porphyry.

Tuscarora District.

NAVAJO.—*Times-Review*, April 29: North drift, 350-foot level, extended four feet and a stope started above the level. No change elsewhere.

BELLE ISLE.—North drift, 350-foot level, extended seven feet, showing some very nice ore. West crosscut, same level, extended 14 feet.

NORTH BELLE ISLE.—No. 1 north drift, 400 foot level south, extended 34 feet, looking very favorable for ore. West crosscut, same level, extended seven feet. South intermediate from No. 1 upraise, south 500, has been extended 25 feet and stope started. Hoisted 46 cars second-class ore.

NEVADA QUEEN.—Second level—No. 1 south drift extended 25 feet, and No. 3 east crosscut 22 feet, leaving 27 feet yet to run. Will make

the connection by the 1st. The raises are all connected on ore, and work suspended on account of ventilation until connection is made on the level; then will start extraction of ore. Third level—East drift from No. 3 raise extended 21 feet; face of drift does not look so well; ore is low grade. South gangway from No. 3 raise extended 20 feet, exposing some high-grade ore. Gangway from No. 2 raise advanced 22 feet. Stopes produced for the week 12 tons first class, assay value \$309 per ton, and 78 cars second class, average \$12 per ton.

Ferguson District.

HIGH-GRADE ORE.—*Pioche Record*, April 28: While the people generally are losing some of that feverish excitement over Ferguson old discoveries, there is taking its place that firm and confident feeling about the district which is usually characterized by a strong intent of purpose that always musters the latent energies to a lively struggle "to be in it" when the opportunity of perhaps a lifetime presents itself. Men who come back from Ferguson now are all in a hurry, and as soon as they get such supplies as will enable them to pursue systematic prospecting and developing, they are off again. Every one who comes from the new district gives an encouraging account of it, and all predict for it a great future. Among the latest arrivals from Ferguson is Mr. S. T. Godbe. Knowing that Mr. Godbe's judgment is held in high esteem on all mining matters, he was sought by an attaché of the *Record* and asked to relate what he thought of the camp in general, to which he replied: "Ferguson is all right. I have seen a good many camps that have been blown up a great deal, and when you went to them, you didn't find what you expected to find, and would come away disappointed; but here in Ferguson I was agreeably surprised, and that is saying considerable. I have been nearly all over the district, and seen all the best prospects. In the April Fool mine they have run a cut about 12 or 15 feet below the first outcrop, which proved a vein at that point of 55 inches in width, carrying over \$1100 in gold, besides the silver. A fair average of the vein will go pretty well in silver, because there is four inches included in the 55 inches that assays 10,000 ounces silver to the ton. Besides the vein itself, they have three or four inches on the hanging-wall that samples \$24,000 in gold. There are three or four feet of soft picking ore in the vein, and in each wall of the ledge there are three or four inches of the quartzite that is literally spattered with gold and richer than the vein matter itself. Of course, this gold in the quartzite has worked in from the fissure. The walls are more or less impregnated with gold for 15 or 25 feet, but it would not be proper to include all that in the width of the vein, because the ledge is comparatively a narrow fissure with its dips, spurs and angles going off into the walls quite a distance. When its owners get fixed for handling low-grade ore, there may be 20 feet of the wall that will pay to handle. The walls are rich in gold, and for a little way in they run up into the thousands of dollars per ton; but then, for some distance out, it would average low. The ore chutes are indicated by the open fissure is shown to be 300 feet long; beyond that the fissure is closed, and there are no signs of mineral. I don't think they can get an assay beyond where the fissure is closed. The April Fool is a fissure, cutting the bed of the country at right angles to the dip, just like the fissures are here in Pioche. They are fissures breaking from one porphyry dyke to another porphyry dyke, although the dykes are in quartzite.

"The Magnolia is the same character of vein. There is now on this ledge a shaft of 25 feet, and the vein has improved regularly as far as it goes down. Messrs. Cohn & Wilson own a claim called the Ferosa that they think is going to turn out big. It is a huge ledge 50 feet wide, and they say it will assay about \$50 in gold per ton. Ferguson district cannot fail to turn out to be a good mining country. I never heard of a vein so pretty as the April Fool, or quite so rich. Of course, it would take a thousand men a year or two to prospect that district, for it is a big mineral belt, and it is covered so much with boulders and soil that prospecting will naturally be slow and tedious. The veins are all on a contact with porphyry and quartzite like the Yuba and Ontario mines, and if they don't go down, then there is no use relying on indications, and there is nothing in the generally accepted principles concerning permanent veins."

Kennedy District.

SOME OF THE CLAIMS.—*Cor. Silver State*, April 29: Spent one day and night at the new camp and visited some of the claims. Charles Kennedy is at work on the Imperial mine, and has run a tunnel 65 feet, incline down 40 feet, and the ore assays from \$20 to \$300 per ton in gold and silver; width of ledge, from 2 to 4 feet. The Cricket mine has a tunnel in 150 feet, and the ore assays from \$30 to \$250 in gold and silver; width of ledge, from 6 inches to 2½ feet. Mr. Kennedy has located placer ground, found color and good indications for placer mines. He has an arrastre just started up which does good work. It is 18 feet in diameter, and crushes about a ton each day. The next location investigated belongs to Lamberson and Northway, and is called Old Kentucky. This is an old claim that was worked in '66 for cinabar. The ore assays 70 ounces in silver, and gold from a trace up to \$60; tunnel 40 feet; width of ledge, 3½ feet. They also are prospecting for placers. J. D. Herley's Pride of the Mountain has an incline down 30 feet; ledge, 6 inches to 3 feet wide, which assays from \$10 to \$150 in gold and silver. Next is Joe Miller's claim, Chipmunk. It has a tunnel run in 90 feet and an incline 30 feet; width of ledge, 4 inches to 1 foot; assays as high as \$150. Kyla and Hillyer have a prospect shaft 40 feet deep; ledge, 6 inches to 2 feet; assay away up. Jake Leick's Bismark has an incline down 75 feet;

ledge, 4 inches to 1 foot; assays from \$10 to \$130. Bent Larson calls his prospect the Accident; tunnel 80 feet; ledge, 1 foot wide, which shows fine bunches of galena. Stone and Wiggins have four claims—the Kersege, Wiggins, Alta and Alice. They assay from \$50 to \$100 in gold; ledges from 14 inches to 4 feet; tunnel 175 feet on the Kersege, and shows good ore all the way through; tunnel about 100 feet on the Alice and 60 feet on the Alta. Daniel Keeler and the Towle Bros., who own the Wall Street, have a tunnel run in 40 feet; assays from \$30 to \$150 in silver and gold. Next is the Enreka, on which there has not been much work done; assays from \$50 to \$100. The C. E. Towle mine has been developed but little, and the ore assays between \$50 and \$100. The T. Towle has an incline down 6 or 7 feet, and assays about the same as the others. Little Johnnie—Not much done; assays about the same. There are altogether about 50 locations made in the camp, many of which I did not see nor get any information on. J. A. Blossom of Battla Mountain was there taking in the camp. He is interested in several good claims, and intends shipping a carload of ore soon. If the returns are satisfactory, he will build a mill there this summer. Keeney is situated in a nice level canyon. The hills are not very high and are smooth, and wagon roads can be made almost anywhere for the purpose of getting down ore. The ground is soft and easily worked, plenty of good timber close by, juniper and pine, and an abundance of good mountain water—a fine place for a town and mill.

ARIZONA.

LYNX CREEK HYDRAULICS.—*Prescott Journal-Miner*, April 30: The above hydraulics have, for the amount of water at the disposal of the management for working, been most successfully worked, and the gravel has proved to be for hydraulicking very rich, and has satisfied the people interested in the property that it is a very valuable one, and one which will be for many years to come worked to a large profit. The only drawback to the property is the scarcity of dump space, which necessitates the boxes being placed on a low grade. The boxes used this season measured inside 3 feet in the clear wide, and were 3 feet deep, but were reduced in the bottom by two 2x12 lining boards, and the grade they were run on was 3½ to the 16-foot box. Two giants were in position and kept up to the banks, and worked together when there was sufficient water. These giants were served by two 9-inch pipes, which pipes were served by a 22-inch pipe from the ditch on the east bank of the creek. The pressure obtainable from the ditch to the workings was 280 feet. It has now been definitely proved that the Lynx Creek hydraulic mines, when served by a dam on Lynx creek, will be one of the most valuable properties in Yavapai county. The Lynx Creek dam access will make irrigation in Lonesome valley profitable, and there can be little doubt but that there is a great future for the Lynx Creek Co., and provided this company be a success, it will be undoubtedly of great importance to Prescott and to Yavapai county, as it will stimulate capital to invest in the county, and capital is what this very rich country suffers from, and is certainly the only thing required to make Prescott a second Denver.

OREGON.

WILL TUNNEL.—*Engene Register*, April 30: As soon as the snow clears away sufficiently the Blue River M. Co., composed of residents of this city, will put a force at work on their claim in the Blue River mining district, and will do about 100 feet or more of tunneling to see what may be found in the way of pay rock. They now have over 300 feet of tunnels in the mountain at different places. They do not care to invest in a mill until they are sure there is a large amount of material to work on.

THE SANTIAM MINES.—*Albany Herald-Disseminator*, April 30: The Albany M. & C. Co.'s 10-stamp quartz mill in the Santiam district has again started up and is now in full blast for the season's run. The company has a large force of men at the works, and have large piles of ore out ready to be crushed. The mill, Secretary Pipe says, will now be kept running constantly day and night. It has a capacity of 25 to 30 tons in 24 hours, and from former results and present indications the company feels positive of a very successful season's work. It is predicted by many that this summer's work in the Santiam mines will fully reward the expectations of those who have invested capital in the extensive mining machinery to work them, and will prove this to be one of the richest mining districts of the Northwest.

PLACER MINES.—*Bedrock Democrat*, April 27: The present season, judging from all reports received from the many placer mining camps throughout the county, is one of the most favorable for the working of gravel diggings experienced in Baker county for many years, and it is reasonable to expect that the placer gold yield will be very large. A *Democrat* reporter stepped into the Baker City National Bank yesterday and was shown by Mr. C. W. James a considerable amount of gold just received from the old reliable camp of Chicken creek, a district that will yield many thousands of dollars if an efficient supply of water is obtained. Nuggets, beautiful specimens, weighing over an ounce, coming from Granite creek, were also displayed. On Sutton creek, Messrs. Palmer Bros. have every prospect of a handsome yield, water being plentiful. These diggings are of known richness. The placers of Sumpter and Granite will soon begin contributing largely. The Pochontas placers will also be operating extensively.

THE MINES.—*Ashland Tidings*, April 23: Wallace Rodgers and John Loftus are sinking a

shaft on the ledge recently uncovered on the hill back of the flaring mill lot in the Roper and Carter summit addition. The ledge was two feet wide at the surface. The shaft is now down about 25 feet, and the ledge has widened to three feet. The vein has every appearance of being a true fissure, and the boys are taking out some very fine looking rock. Prospects all improve in the Ashland mine on Patton ledge—drifts now about 100 feet from shaft—three feet of rock assaying from \$15 to \$48 to the ton. The wagon road will be ready for use next week. J. H. McBride is interested with E. K. Brightmen in the holding of the Coolidge and Sutton land, on which coal has been found, east of Ashland, and on Tuesday he began work with a force of several men, running a prospecting drift. The discovery of the coal croppings there was first made some years ago, it is now learned, but no prospect work has ever been done. The coal taken out burns well and does good forge work.

NEW MEXICO.

SMELTER SOLD.—*Southwest Sentinel*, April 26: The smelting plant at Pachel, in the Burnn mountains, has been sold to Nick Gales, and will be removed to Hillsborough. Work has been commenced on the smelter site at Hillsborough, and the plant will be in operation early in the summer. Placer mining will be carried on more extensively in Pinos Altos district this summer than for many years past. Of late the placer mines there have been worked mostly by Mexicans and Chinamen, and in a small way. Now the mines will be worked in a more systematic manner, and the product will be largely increased. Felix Leavick is developing the Maud S. and Link mines in the Silver Creek district, which were recently purchased by an Eastern company. The machinery for the new electrical ore reduction works at Albuquerque has been ordered, and the plant will be in operation this summer. It is claimed that refractory ores can be successfully treated by this process, and experiments have been made with ore from this county which are said to have been highly satisfactory. Ex-Governor Stover, who is one of the members of the company which will erect the works, is very enthusiastic, and is certain that the venture will be a success. If it will do what is claimed for it, a large number of mines in this Territory which produce low-grade refractory ores can be worked profitably. A large percentage of the metal in refractory ores, treated in the mills in this county, is lost in the tailings which, if saved, would very largely increase the bullion product and would make the operation of the mines now being worked much more remunerative and, in addition, make it possible to work many mines which are now idle.

WASHINGTON.

NEW DISTRICT.—*Seattle Mining News*, April 30: A gentleman from Tacoma, who has recently returned from a prospecting trip to the new district on Marshall creek, reports very favorably of the mines there. Among the most prominent are the Jesse Harbor, 40-foot ledge of free-milling quartz, assaying \$48 gold; the Grizzly, 9-foot ledge, and the Mountain Queen, 8-foot ledge, and only one wall yet found. All the ledges are free-milling and though the ore is low grade, the quantity and accessibility will doubtless make this one of the prominent districts soon. There has been no snow of any consequence all winter, and the only drawback to prospecting is the dense growth of timber and vegetation. The mines are located 30 miles southeast of Tacoma.

THE RESERVATION.—Word comes from Colville that the people of Stevens county, tired of the slow progress of Congress in the matter of opening the Indian reservation to settlement, have held meetings to consider the question, and the impression is that the Indians have no valid title to land; that they are only tenants by sufferance, and that the restoration of the land to the public domain is simply a matter to be determined by voluntary appropriation. It is estimated that there will be 2000 people from the adjoining country on the reservation within ten days. It is known to be rich in gold, silver and coal, as well as timber and agricultural lands. Miners are preparing to go in on every hand.

STILLAGUAMISH.—Work has been pushed all winter by the Stillaguamish Hydraulic M. Co. Morrison & Co. have increased the force on the Hoodoo, and will soon begin on the Silver Boda. The Lulu, one of the first discoveries in this district, and on which some development work was done last season, will be opened up this summer. The Malody Bros are erecting building and getting in shape. The Anacortes is opened up sufficiently to have a steady shipper, and has considerable good ore on the dump awaiting transportation. They have been working all winter and will increase the force immediately.

SILVER CREEK.—The Silver Slipper and Four Brothers claims in Silver Creek district, were sold last week for \$6000. Prospectors and mining men are arriving in Galena daily, and notwithstanding the backwardness of the season, they are pushing in with the determination to go to work any way.

SWAKE MINES.—*Cor. Ellensburgh Capital*, April 23: Mining news is very scarce, the weather being so bad that everything is at a standstill. The hydraulic mines are running full blast and the rain just suits them. There is some little stir in quartz. W. A. Ford, T. W. Smith and W. H. Kaup have two capitalists negotiating for the Buck Horn mine. Ford & Co. ask \$15,000 for three claims and are willing to take more, but no less. Tweet, Johnson & York will commence grinding quartz with their new arrastra next week.

MECHANICAL PROGRESS.

Boiler Tests.

Mr. Geo. H. Barrus, of Boston, has written a treatise on boiler tests, embracing the results of 137 evaporative tests made on seventy-one boilers, conducted by the author. In summing up the general conditions which secure economy in using coal, says the *American Manufacturer*, he shows that the highest results are produced where the temperature of the escaping gases is the least. In other words, the greater the amount of heat which is absorbed by the heating surfaces and the water in the boiler before the heat escapes up the chimney, the greater the economy, which ought to be very obvious, but which is often overlooked. The temperature of the escaping gases which will produce the best results, the author concludes, will be about 375° for anthracite and 415° for Cumberland (bituminous) coal.

The relation between the heating surface and the grate area which will produce the highest efficiency is also considered. The conclusion is that for anthracite coal it should be in the proportion of 36 to 1, and that either more or less produces a loss, when the rate of combustion does not exceed 12 pounds of fuel per square foot of grate per hour. For bituminous coal the ratio should be from 45 or 50 to 1, and the conclusion is drawn that a "much larger amount of heating surface is required for obtaining the full efficiency of bituminous coal than for boilers using anthracite coal."

Another interesting conclusion deduced from the experiments is "that a certain minimum amount of tube opening is required for efficient work." The highest efficiency, he concludes, with anthracite coal is obtained when the tube opening is from one-ninth to one-tenth of the grate service. For bituminous coal he concludes that the area of the tube opening should be from one-sixth to one-seventh of the grate service.

A comparison is then made of the economy of different kinds of boilers, which is very interesting; but there is room here to give only the writer's conclusions. The form of horizontal boiler, he says, which with suitable proportions and operation can be depended upon to give the highest evaporation is the common horizontal return tubular boiler so widely used in New England factories.

"The general conclusion," he says, "to be drawn from all these comparisons is that the economy with which different types of boilers operate depends much more upon their proportions and the conditions under which they work than upon their type; and, moreover, that when these proportions are suitably carried out, and when conditions are favorable, the various types of boilers give substantially the same economic result."

A separate section is devoted to a comparison of the value of different kinds of coal, the general results of which are given in the following table:

Name of Coal.	Pounds of water evaporated from and at 212 degrees per pound of dry coal.
Anthracite, broken.....	9.79
"Cumberland," bituminous.....	11.04
Anthracite, chestnut.....	9.40
"Pea".....	8.86
Two parts pea and dust and one part Cumberland.....	9.38
Two parts pea and dust and one part culm.....	9.01
Nova Scotia culm.....	8.42

Some tests were also made to determine the value of petroleum as a fuel, the conclusions from which the author sums up as follows: "This means, in round numbers, that the price of oil must be less than one dollar per barrel, delivered at the boiler, in order that the cost of fuel and labor for a 1,000 h. p. plant shall be equal to that which obtains when Cumberland coal is used at \$4.56 per ton."

To Facilitate Lathe Work.

A Providence (R. I.) man has invented a device for facilitating the performance of lathe machine work. The apparatus, says the *Manufacturers' Gazette*, consists of a bearing block with a base plate to be fitted on the gibbed ways of the tool carriage of a lathe usually occupied by the tool post, the place of which it takes. The block is made a bearing to receive the journal of a vertically revolving tool holder, which has the parts named. A circular head is held by a horizontal journal on its back in a bearing in the block. Its face contains four radial channels at right angles to each other, but the number of these channels may be more or less, according to the size of the head.

These channels are adapted to hold tools similar to those in use for turning, milling and working on metal in a lathe. Setscrews

fitting in cavities made in the head between the channels hold the lathe, the screw being fitted to screw through the flange between the cavity and the channel, and bearing in the tool, hold it firmly against the opposite side of the channel. The open channels to receive the tools is one of the improvements over the mortises specified in a previous patent, as the channel gives greater facilities for setting the tools, allows them to be turned to one side if required, and a thicker or a crooked tool can be easily held. The automatic operation of the stop bar is another improvement, inasmuch as when the head is turned to bring up another tool toward the work, the projection that holds the leveling screw will push back the bar itself, obviating the use of a hand lever.

This is done by pivoting the bar at its back end in the slot so that its front end will easily swing out when the projection comes up against it, and allow the projection to pass, the bar being drawn in back under it by a light spring. There is also an arrangement by which the bar can be pushed out from the front, if desired, by pressing on a boss which is connected by a small rod pivoted to the bar and screwed into a hole in the boss at the other end. The spring is held on this rod so as to bear at one end on the boss and the other end against a shoulder of the recess that holds it. There are projections or lugs through which the leveling screws are tapped so as to bring the heads on the top, where they can be easily adjusted to set the tool exactly right at once, instead of going through an unnecessary lot of turning and guessing, all of which entail a certain loss of time with less satisfactory results.

The journal that the head turns on does not extend way through the block, but the bearing is bored nearly through, and a hole is made in the center to receive a tightening bolt that extends through the head and journal out through this hole, and has a screw-nut fitted on its end, which, by means of a wrench, draws the bolt in and holds the head firmly to the block.

As the tools are necessarily short and difficult to handle by a blacksmith in making or repairing, a cutting part is provided on each end, so that when worn out at one end it can be reversed and used as much longer.

Aluminium Soldering.

The following methods of soldering aluminium are recommended by the Neuhausen Company, and published in the *Scientific American*. For sheet aluminium an iron solder may be used with a flux composed of resin, neutral chloride of zinc, and grease. The metal should not be cleaned or scraped unless it is absolutely necessary to do so, in which case alcohol or essence of turpentine should be used for the purpose. For five per cent aluminium bronze tin solder may be employed, but this is not possible with the 10 per cent alloy, in which case the company recommends a preliminary copper plating. If it is difficult to dip the ends to be plated directly into the solution, pieces of blotting paper soaked in a solution of CuSO₄ may be laid on them and a current passed. The flux mentioned above may be used.

Another solder which is recommended is one consisting of copper 56 parts, zinc 46 parts, and tin two parts, applied with borax. Some tests made at Neuhausen showed that with these solders plates of aluminium soldered together, edge to edge, required a tractive effort of from 16½ to 18 tons per square inch to pull them asunder; if the edges overlapped, 22½ tons per square inch were required. Pieces of cast aluminium bronze, if placed in sand moulds, can be joined together autogenously by running in some of the molten metal. If this operation is properly carried out, the joint is indistinguishable from the rest of the casting. Thin cylinders of aluminium are made in this way by bending the sheets round end to end, and soldering with molten aluminium.

ENGINEERS' TEST FOR IRON.—At the meeting of the Liverpool Engineering Society, held recently, Mr. Thomas Morrison read a paper on "Engineers' Tests for Iron Considered, and Suggestions for Standard Uniform Tests." The author showed by tables of numerous engineers' tests how engineers would ask for different tensile strains for some class of work, adding that the iron must be equal to some known "brand," as though the iron produced in the localities named were uniform in quality. He paid a high tribute to the reduction of area test, as being one that gave more consolation to the engineer in case of work coming to grief than any other test specified. The elongation test, which he said was only another form of test for ductility, was not to be depended upon with the same ease and comfort as contraction of area; and the manner

in which the former test was specified by nearly all engineers was anything but creditable. He treated the limit of elasticity test with disfavor. His suggestions for standard uniform tests and conditions were put in the simplest form, and were thoroughly explained to those present.

SCIENTIFIC PROGRESS.

Schools of Science.

The State University at Berkeley announces its intention of repeating the courses of instruction in chemistry offered to the general public during the summer of last year under the denomination of "summer school," and also of offering for the first time a summer school of biology. The school of last year, though very little advertised, was well attended and successful. The authorities wish to make it known to more people this year that all those interested in the science may avail themselves of the opportunity to study it. The chemical laboratories have just been completed and equipped in such a way as to offer as good facilities for chemical work as can be found.

The characteristic features of the course will be the opportunity for practical work in the laboratory. Each person taking part in the course will have a desk and the necessary reagents and apparatus at his disposal and will receive such personal assistance and guidance as may be necessary. The course is intended primarily for the teachers of the State, especially for those who wish to prepare themselves as teachers of chemistry. Special attention will be given to points connected with the successful conducting of experiments before classes and to the precautions to be observed. In a word, it is intended to make this a training-school for teachers. Applicants are requested to state their preparation, whether elementary or advanced. Advanced students, who do not require such direct and personal supervision, will be allowed to carry on such lines of advanced work as may be agreed upon. Certificates of proficiency will be given to those members of the class who distinguish themselves by their daily work and who pass a satisfactory examination at the close of the term. This examination is not required, save from those who wish certificates.

No tuition will be charged, as all the University courses are free, but a deposit of \$10 will be required, \$5 of which will be retained for the chemicals used. The cost of the apparatus that may be broken will be deducted from the remainder and the surplus will be refunded to the student. The session will begin on Wednesday, June 22d, and will be under the personal supervision of Professor E. C. O'Neill, one of the most popular instructors at Berkeley.

The summer school of biology will be of a slightly different character. Professor Ritter, who is now in charge of the department of biology, wishes to accomplish some permanent results in contributions to science. To that end he intends to devote the work of his summer school to marine biology. The ocean along the California coast contains many varieties of marine life that are to be found in no other region accessible to scientists, and it is very important to the science of evolution that these varieties should be thoroughly worked up. No one has ever undertaken the work and Professor Ritter wishes to gather a number of earnest students to assist him in beginning it this summer. Adolph Sutro has offered the use of his new and splendid aquaria at the ocean beach in San Francisco to Mr. Ritter, which will make it possible to preserve and study the organisms as they live and move in their own element. Elaborate collections will be made from Monterey and, possibly, Santa Barbara bay, and transferred to Mr. Sutro's aquaria. The work will begin some time in July. Further announcements will be made next month. Meantime inquiries should be directed to Professor W. E. Ritter, Berkeley.

THE GULCHER AND PINTSCH THERMOPILE.—Twelve or more blocks of copper are arranged radially round a center, forming a tube, through which the flame of a Bunsen burner passes. To the back of each of these pieces of copper (which are insulated from each other) are connected the ends of plates of antimony-zinc alloy and nickel; the former being cast onto the copper, and the latter brazed. The outer end of the nickel is connected to the outer end of the antimony of the next couple, and so on round the ring; the series being—Cold Sb-Ni, hot Ni-Cu, hot Cu-Sb, cold Sb-Ni, etc. Large copper plates are attached to the cold junctions to facilitate radiation. Several of the

rings thus built up are placed one over the other, separated by asbestos, which is the insulating material used through the tube thus formed. The whole is in an outer case, through which a draught of air is induced by joining it to the outlet of the central into the chimney.—La Lumiere Electrique.

Theory of Thunderstorms.

Solids and liquids cannot be charged throughout their substance with static electricity; if charged at all, the electricity is upon their surface. But gases and vapors being composed of myriads of separate particles, can receive a bodily charge. The air in a room in which an electric machine is worked is found afterwards to be charged. The clouds are usually charged more or less with electricity, derived probably from evaporation going on at the earth's surface. The minute particles of water floating in the air being better conductors than the air itself become more highly charged. As they fall by gravitation and unite, the strength of their charges increases. Suppose eight small drops to join into one. That one will have eight times the quantity of electricity distributed over the surface of a single sphere of twice the radius of the original drops; and its electrical potential will therefore be four times as great. Now a mass of cloud may consist of such charged spheroids, and its potential may gradually rise, therefore, by the coalescence of the drops, and the electrification at the lower surface of the cloud will become greater and greater, the surface of the earth beneath acting as a condensing plate and becoming inductively charged with the opposite kind of electrification. Presently the difference of potential becomes so great that the intervening strata of air give way under the strain, and a disruptive discharge takes place at the point where the air offers least resistance. This lightning spark, which may be more than a mile in length, discharges only the electricity that has been accumulated at the surface of the cloud, and the other parts of the cloud will now react upon the discharged portion, producing internal attractions and internal discharges. The internal actions thus set up will account for the usual appearance of a thunder cloud, that it is a well-defined, flat-bottomed mass or cloud which appears at the top to be boiling or heaving up with continual movements. Electrical Age.

ALUMINIUM.—Mr. J. H. Dagger, in a paper read before the Liverpool Section of the Society of Chemical Industry, says that aluminium can never possibly take the place of steel and iron for structural purposes, such as bridges and heavy machinery; it is not a rigid metal, and its elasticity is low; though it is only one-third the weight of iron it has less than one-half the tensile strength of the best wrought iron, and one-third that of mild steel. But it is the lightest of all industrial metals, and this lightness is combined with a tensile strength not far below gun-metal when it is rolled or drawn, and equal to cast iron in castings. It is an excellent conductor of electricity, its melting point, 700° C., is between that of zinc, 433° C., and copper, 1082, its high specific heat making it most valuable of all metals for fine castings and light machine work, and with this corrosion resistance only inferior to the noble metals. Aluminium, surely, with these properties, needs no special pleading.

ELECTRIC OSMOSE.—Porret observed, says the *Electrical Age*, that if a strong current is led into certain liquids, as if to electrolyze them, a porous partition being placed between the electrodes, the current mechanically carries part of the liquid through the porous diaphragm, so that the liquid is forced up to a higher level on one side than on the other. This phenomenon, known as electric osmose, is manifest when badly conducting liquids, such as alcohol and bisulphide of carbon are used. The transfer through the diaphragm takes place in the direction of the current; that is to say, the liquid is higher about the cathode than round the anode.

ELECTROLYTIC SEPARATION OF MERCURY FROM COPPER.—Messrs. E. F. Smith and A. W. McCauley, in the course of an article, state that this separation was attempted previously, but was not complete unless the amount of copper present in solution did not amount to more than 20 per cent. of the mercury present in solution. It has now been ascertained that, by careful regulation of current, it is not only possible to separate the two metals, when present in equal quantities, but also even when there is twice as much copper present as mercury.

ELECTRICITY.

Electricity in Mining Operations.

In the *Electrical World* of March 5th the subject of power transmission was treated by Mr. Schlesinger from the standpoint of the man who owns the plant and rents his power to the consumer. This method of treatment gave a set of very interesting curves showing the cost of power transmitted at various voltages and for different distances at a constant voltage. Looking at the problem from this standpoint, it was pointed out that the question to be considered is not so much that of making the cost per horse power delivered by the motor a minimum, as it is one of making the net profits derived from each horse power available at the generating plant a maximum. In this consideration, the fact that the conditions of minimum cost of operation do not necessarily give the most efficient plant plays an important part. In a recent paper by Mr. Irving Hale, this subject is discussed in the most comprehensive way with the view of pointing out the present limitations of electric power in its application to mining operations. Mr. Hale has taken a very conservative view of the situation. His aim has been to point out the fact that there are at present certain well-defined and easily ascertained limitations beyond which the use of electric power in mining operations would prove uneconomical and therefore undesirable, and he has in his very exhaustive study shown that these limitations are under the specified conditions. This does not mean, however, that he takes a pessimistic view of the applications of electricity to mining operations, as he points out that there is at the present time a wide and profitable field in this direction, and that the next few years will see numerous developments in this branch of electrical engineering. It is expected that certain improvements in present methods of transmission will gradually extend the limits which now define the economical use of electricity for this class of work.

But Mr. Hale indicates that there are certain well-defined secondary limits, to pass which some very radical changes in the whole method and apparatus employed will be necessary. He is an ardent advocate of the direct method of transmission of power as distinguished from the method of double conversion. He does not deny, however, that the three-phase system may render practicable transmission to distances far beyond what may be obtained by continuous currents, provided the price of coal is high enough to give sufficient margin to pay interest on the cost. A single instance which he cites is that a double conversion plant using 6000 volts in the primary costs less than a direct transmission plant using 220 volts when the distance is greater than 8700 feet, and less than a 440-volt direct plant when the distance is greater than 17,600 feet. In this, as in other cases, however, the comparative efficiencies of the two systems must be taken into consideration when determining which plant should be used. Here the total efficiency of the double conversion plant at 17,600 feet is given as 44 per cent, and the efficiency of the direct plant 55.4 per cent. In considering such problems as this, it is at once evident that the local conditions must be carefully taken into account, for in the case just cited the low efficiency of the double conversion system would have little weight provided there was an abundant supply of water power which would otherwise be unused. Up to the present time the use of electricity in mining operations has been far below that which it may be expected to reach in the near future, since many of the large electric companies have for the last two or three years been so completely occupied in developing the electric railway that they have had very little time or energy to give to the very important field of electric mining.

HOME-MADE ELECTRICITY.—A French chemist, who has given considerable attention to the problem of heating and lighting from a single source, has devised a novel stove, says *Iron*, which in appearance resembles an ordinary heating-stove. It is so arranged internally that the waste heat is utilized for the generation of electricity. This object is attained by the presence of a number of rectangular boxes of sheet iron, containing the necessary metallic elements for furnishing the current. These elements are insulated by asbestos, and the cooling is effected partly by the shape in which the metallic alloys are cast and partly by the circulation of air. The current obtained is not great in quantity, but the result of the attempt appears to be favorable. Accumulators are used for storing the electricity, and as heat is required for a much

longer period than light, the electrical energy which would be lost during the hours of daylight is saved. A point of considerable moment is that the heat utilized in this way is waste heat, so that any portion which can be recovered in the form of electricity is so much gain.

Electricity in Agriculture.

The recently awakened interest of the more advanced section of the farming community in the subject of the utilization of electricity in agriculture, lately alluded to in the *Western Electrician*, was exemplified by the action of the United States Senate when, on motion of Senator Peffer, a resolution was adopted requesting the Secretary of State to obtain from our consuls abroad information as to the application of electricity to the propulsion of farm machinery and to the propagation and growth of plants. The Kansas senator explained that it was understood that electricity had been applied in Italy to the compression of hay and also that electrical influences had been successfully used in the vicinity of Paris in the propagation of cabbages, and there was a desire on the part of the farmers to obtain definite information on these subjects. Much valuable information can doubtless be collected in this manner, as many scientists, and practical agriculturists both at home and abroad, are now studying this problem. The publication of the consuls' replies will be awaited with interest.

That there is a growing demand for information of this sort is shown by the fact that in many sections of the country experiments are being conducted on this line. A press dispatch from Auburn, Ala., announces that on April 16th, cotton was ginned by electricity for the first time in the history of the world at the Agricultural and Mechanical College of Alabama. The class in electrical engineering, under the direction of A. F. McKissick, connected the generator at the dynamo room of the college with the motor at the Statum farm about 3,000 feet away, and the motor at the farm did the work of a ten horse power engine formerly used, grinding corn for cow feed and ginning cotton.

Of course as far as the electrical engineer is concerned the application of a motor to a cotton gin or any other piece of farm machinery is no startling departure. Such experiments and new adaptations as the one just referred to, however, do an immense amount of good indirectly in that they serve to bring electric power to the notice of the agriculturist. We must reiterate our conviction that an experimental station such as Senator Peffer of Kansas proposes would do an immense amount of good by educating farmers in the many advantages of electric power.

WATER POWER FOR GENERATING.—The wide awake Manager of the Walla Walla (Wash.) Gas and Electric Company has convinced the proprietors that water power sufficient for the purpose of operating the company's electric station can be obtained from Mill Creek, which watercourse is about four miles above the city. According to information in the *American Gas Light Journal*, the water will be conveyed through wooden mains, 42 or 48 inches in diameter, for about a mile, or to the site where it is proposed to locate the water wheels and additional electric generating machinery, from whence the current will be led, by means of a naked copper wire, strung on 40 feet poles, to the old power house, where a T-H. motor will receive the current for the purpose of driving the dynamos, at present moved by steam, that supply the currents to the lamps in use in the city. Mr. Burrows estimates that about 275 horse power can be relied on, and he puts the probable cost of the installation at \$50,000.

UNDERGROUND WIRES.—The *Chicago Journal of Commerce* says that after several weeks of preliminary running, the North Chicago Street railway has put in regular operation its underground electric system on Webster and Fullerton avenues. Two motors are employed to haul the trailers around the loop, making connection with the Lincoln avenue trains. The system in use is controlled by the Love Electric Traction Company, and in operation it is much the same in appearance as a cable line. The wire which furnishes current for the motor is carried in an underground conduit with slot rail very much the same as on the cable lines. The conduit, however, is much shallower, and there is less expense in building, as the heavy yokes are replaced by much lighter ones. The wires are strung on nonconductors, and the trolley, which takes up the power, runs in the slot, as a cable's grip.

WELDING STREET RAILS.—The electric welding of street railway rails as a substi-

tute for fish plates has been the subject of experiment for some time at the works of Johnson Rail Company, Johnstown, Pa. The *Electrical Review* says the experiments are now said to be entirely successful, and it is possible to weld by electricity two pieces of steel of 25 square inches section, and a solid steel rail, three or four miles long, can be had if required. The tests also are said to prove that the necessity of joints to provide for contraction and expansion is not so apparent as supposed by engineers. The process has also been successfully applied to welding of wire cables.

USEFUL INFORMATION.

SIMPLE METHOD OF SMOKE CONSUMPTION.—William Westlake, of Brooklyn, N. Y., having given several years of study to the subject of smoke consumption has perfected a system whereby he claims smoky coal, tar, shavings and similar fuel can be used under boilers without smoke. In describing his invention which he has not patented, wishing to give the public the benefit of his experience, he says: I tried here in Brooklyn two methods of burning soft coal. First, it is important to know what soft coal is composed of. In one ton of soft coal one-half is water. This water becomes steam in the process of passing over heated fire brick and the coke. Before the air is applied the gases must be heated. Instantly, after the coal is freshly put on, give it all the air possible from forty to one hundred seconds. Georgia pine shavings want over two minutes. In burning shavings the feed doors can be kept open all the time—so the doors might be kept open for coal, if the fireman would take the trouble to keep the coal close up to the top of the brick arch. Fine coal should be used. When the bank of coal is turned into coke, a long poker should be used to get the ashes into the ash pit—the fresh coke should be broken up to take the place of previous charge. I have thoroughly tested this simple method to perfection. Firemen are like sailors—they think they know everything, and I found it very difficult to introduce here; besides, there is no way to enforce it. There is a saving of about 20 per cent. This pays for keeping the brick work in good order and the fireman will have to be compensated for a little extra attention.

COLORS IN TEMPERING IRON.—Investigation as to the cause of the production of colors in tempering iron satisfactorily shows it to be due to the formation of thin films of oxide on the surface of the metal when it is heated in the presence of air. It also appears from recent researches that the oxide so produced is practically transparent, first, because the sequence of colors is what would be expected in films of a transparent substance when the thickness of the films gradually increases; also, because of observations on the reflected light, the color of which varies somewhat at different angles; but chiefly because it is found that on increasing the temperature a little above the point necessary to produce a dark blue, the color gradually disappears, and the surface, though covered with more oxide, becomes almost colorless again. The colors being the result of oxidation, it is probable that the nature of the surface to be heated, its freedom from any soiling, and the length of time during which it is heated must exert a considerable influence on the shade produced.—*Iron*.

ARTIFICIAL DIAMONDS.—Mr. Streeter, in his book on "Precious Stones and Gems," says that a good deal was heard at one time of the experiments of Mr. J. B. Hannay, of Glasgow, in making artificial diamonds. The philosopher's stone, it was said, was at length discovered. Then the subject was allowed to drop. Here is the sequel. The so-called diamonds were found to crumble to pieces when placed on the wheel for cutting. Worthless as these gems proved to be, they were not obtained without much labor, expense, and above all, risk to human life. A peculiar mixture of paraffin and certain metals and minerals was put in a strong wrought-iron tube, and subjected to the heat of a reverberatory furnace. In most of the experiments the tubes exploded, and, in some cases, the assistants were injured in consequence.

TESTING THE ATMOSPHERE OF MINES.—A method of examining the atmosphere in mines is being used at Kolscheid, near Aachen, Germany, in which electricity is employed. Briefly, it is as follows: A gas-holder is placed in the chief ventilating shaft, and is so arranged that it becomes filled in twelve hours; in this way it is possible to obtain a fair average sample of the mine air. The air thus collected is examined by means of a Coquillion's grisometer.

Any free carbonic acid gas that may be present is absorbed by caustic soda, and its percentage estimated by noting the diminution in bulk. The marsh gas is then decomposed by a platinum wire heated to incandescence by means of an electric current. A further diminution in bulk takes place, and this being observed, the percentage of marsh gas in the pit air can be calculated.

FLOUR PASTE.—To make a paste that will "stick like grim death," heat some water to boiling, then stir in flour, keeping it free from lumps. The best way is for one man to stir the water while another drops in the flour through a sieve. The stirring is continued until the paste is as thick as desired, then continue a little longer to make sure that there are no lumps of flour left in the mixture. Care should be taken that too much flour is not sifted in, or the paste will become too thick, as it takes a little time for the last flour put in to affect the rest of the paste. The paste may be strengthened by adding to the flour one-sixth its weight of powdered resin. To make the paste keep for months without souring, add a few drops of oil of cloves. A little carbolic acid will do as well, but it does not suit the nose as well, by a good deal.—*Blacksmith and Wheelright*.

M. M. SCHNEIDER ET CIE. (Cruesot) manufacture a steel containing from two to four per cent of copper, which is stated to impart a greater resisting strength, elasticity, and malleability to the metal.

GOOD HEALTH.

Does Danger Lurk in Aluminium.

Despite the efforts of German chemists to prove the innocuity of aluminium in contact with foods and fluids, says *Iron*, events occur from time to time which tend to show that the metal exercises a deleterious effect on alimentary substances. Private advices from German military sources report a circumstance which is likely to impress upon Continental military authorities the necessity of caution in the adoption of aluminium as a material for soldiers' mess-tins and water-bottles. The extreme lightness of the metal was considered so advantageous that water-bottles made of it were not long ago issued to some of the German troops. A soldier belonging to an infantry regiment stationed at Nuremberg had his bottle partly filled with cognac. After several sips he was taken ill, and vomited. On hearing the particulars the doctor decided to send the bottle and its contents to an analyst. The latter discovered in the bottle some brownish-black spots, round in shape, which, under analysis, were found to contain large proportions of aluminium and iron. The cognac had become muddy. The analyst declared that the cognac had caused a strong corrosion of the metal. On the other hand, Messrs. Browett, Ashberry & Co., of Birmingham, write as follows: "We have for the last two years been experimenting with aluminium, with a view to introducing it to our customers, made up into ordinary table-ware, and the following are some of the results arrived at. A flask made of it has been in constant use by one of our friends for the past eighteen months, containing at different times brandy, sherry, claret, beer and milk. So far not the slightest ill-effect has ever been perceptible, and not the least smatch or bad taste has been imparted to the liquor as is so often the case with common metal and poorly electroplated flasks. For dishes the result seems equally satisfactory, neither meats, gravies nor sauces—hot or cold—no matter how long they have been allowed to stand, have any effect upon it, neither are they acted upon by the metal. Apple juice, which is considered a severe test, and acts and is acted upon by most metals, with aluminium appears to be quite innocuous. Tea also appears to be equally wholesome made in an aluminium vessel as in a real silver one, and even after standing several days there was no discoloration of the metal and no perceptible change in the tea. Vinegar, which acts upon most metals, does not appear to touch aluminium nor be affected by it, neither does potash nor soda water. We all know that tin is a perfectly pure and harmless metal, and that fish and meats may be preserved in it for an indefinite period, but not so the common solder with which meat tins are put together, hence the many fatal results from eating tinned salmon and lobster. In cases where deleterious effects have resulted from the use of aluminium vessels, it is probable that if the metal had been assayed it would have been found to be made of an impure and spurious alloy—not pure aluminium."



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W. B. EWER, SENIOR EDITOR

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SAN FRANCISCO:

SATURDAY, MAY 7, 1892.

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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Divided Notice—Pacific Coast Box Co.
Remington Typewriter—G. G. Wikson & Co.
Rooms With Power—Pacific Power Co.
Situation Wanted—Assayer, this office.

See Advertising Columns.

THE Northern Pacific Railroad Company has appealed from the decision of the United States Court of Montana, asking that Chas. W. Cannon et al. be restrained from holding a certain quarter-section of land which was deeded to the railroad by the Government as agricultural land, but which the defendants took up as mineral land. The question involved is whether the land is mineral or agricultural, and the Land Office and United States Court of Montana have decided it is mineral land.

A SECOND LEADVILLE.—An exchange says that Creede camp promises to become a second Leadville. The number of people going into this wonderful camp is unprecedented in the history of Colorado, except during the Leadville excitement. It is estimated that now that the townsite is located, there will be 10,000 people in the camp by June 1st. The new discovery is only reached by the Denver & Rio Grande railroad, and there is no staging.

PREPARATIONS are being made at Fort Wingate for the expedition which will start May 10th, to accompany the commission to examine the Acarizo Mountain country and to report on its character, whether or not it contains mineral and precious ores, and, if so, to treat with the Navajos for its transfer to the United States.

Milling at Bodie.

The rehabilitated Standard mill of 20 stamps at Bodie, is one of the oldest in the district, and has been run steadily on ore from the Standard mine during the past year. The ore is crushed wet and run over silvered copper plates which take out about 80 per cent of all the free gold and silver contents. The major part of the remainder stays in the batteries, being too coarse and heavy to be thrown out through the screens and is extracted by amalgamation in the clean-up pan at the end of every month. The pulp leaving the plate is run over four Frue vanners with belts six feet wide, and the tailings from these are led into pointed settling boxes in order to get rid of the surplus water from the batteries and vanners before treatment in the pans. The thickened pulp discharged from the settling boxes is raised by means of a bucket elevator to a series of eight pans and three settlers, arranged on the Boss continuous system. From the settlers, after passing through an agitator, the tailings escape into the tailings-beds.

During the past year the mill crushed 15,704 tons. The average crushing for the first five months is 1249 tons, during which time a No. 10 (corresponding to 40 mesh) Russia-iron slot screen was used in the batteries. The average crushing for the last seven months was 1351 tons, a gain of 102 tons per month, accomplished by the use of a No. 0 (corresponding to 40 mesh) tin-punched screen.

Analysis shows the ore to contain no base metals other than a very small amount of iron oxide; nevertheless, it is only partially free milling, and the percentage of extraction is consequently low. The mercury on the plates and in the pans takes out all that will amalgamate. The remainder needs a different treatment, and this was described in last week's PRESS under heading of "Treatment of Tailings."

The present system of milling gives three to five per cent better results than that previously in use.

Richer ore gives higher results on account of carrying a greater proportion of free precious metal; while treating the lower grade, the extraction has only been maintained by the at least partially successful amalgamation of tailings in the continuous pans.

That, working on a lower-grade ore, they are obtaining a higher extraction than in previous years is certainly satisfactory, when it is understood that ore treatment is limited to a certain line of milling operation by the high condition of labor, expensive fuel and costly freights obtaining at Bodie. That milling is being done at a much reduced cost is shown by the fact that 15,704 tons of ore were crushed the past year, at a total milling expenditure of \$61,002.94, or \$3.89 per ton; when, as stated in reports, in 1891 but 11,498 tons were crushed at a cost of \$60,000, or over \$5.20 per ton.

The four concentrators produce on an average of 10½ tons of concentrates per month, worth from \$80 to \$100 per ton. This is a content of concentrable material in the original ore of two-thirds of one per cent, showing the ore to be hardly of a concentrating character. Nevertheless, the vanners once introduced cost so little to operate, while furnishing a high-grade product, that it pays to continue running them.

As the concentrates contained no sulphur and little or no base metal, Manager Leggett filled up two pans in the mill and put them through a specially adapted slow treatment, getting a yield of 31 per cent over that obtained by shipping away to reduction works.

A Carter magnetic separator, through which the dried concentrates were being passed in order to eliminate the magnetic iron oxide (of which they contain 5 per cent to 10 per cent) was discarded, as pan-amalgamation tests show 16 per cent higher

extraction on the original concentrates than on those that had gone through the separator, though the bullion produced was necessarily baser.

The concentrates are now being regularly treated by pan amalgamation, as the best and cheapest method of realizing on them quickly.

Careful chlorination tests, after roasting with salt and sulphur, have shown no higher percentage of extraction than that obtained by slow amalgamation, as practiced at Bodie. Moreover, the loss of gold and silver in roasting is considerable (15 to 20 per cent), and the cost with wood at \$10 a cord, greater than that of amalgamation, for which the mill is already fitted.

Foundries and Freight Rates.

The foundries of this city labor under some disadvantages in the matter of supplies of coal and iron, since neither of these essentials in their business are obtained in this State. They exist here, it is true, but the coal is poor and no iron is made from the known deposits of ore. Most of the coal used is foreign and pays duty, and the iron the same way, though some of this comes from the East. Of course, as a tariff must be general, our people are sufferers that those in the East may be benefited. Wages are high here, too, and that is another disadvantage.

But the great drawback to industrial advancement is the limited area for the shipment of machinery, etc., owing to the freight rates charged by the railroad company. If that company were more public spirited or cared to encourage home manufactures at all, it might adjust its tariff in such a way as in a measure to offset the local disadvantage of the national tariff.

It was only a few weeks since that a heavy contract for mining machinery went to Chicago instead of this city, because they could ship the mill, etc., to Durango, Mexico, cheaper from Chicago than from here.

This machinery had to go via El Paso over the Mexican Central to Jimenez, the nearest station to the mine. The distance is greater from Chicago by one-third, but the freight rates on the other lines were very much less than on ours.

This is a state of affairs that admits of remedy, but this must come from the railroad. The foundrymen, who fought the late strike so successfully, ought to make a united effort in their own behalf, and try and convince the railroad company that it is making a mistake in restricting our market as it does. The machinery trade of the coast States of Mexico on this side naturally belongs here, and we formerly had it, but like the trade of the Northwest, it is gradually being lost. This is entirely due to railroad charges.

The foundries here all report business as dull, and less men are being employed than usual. They could do twice as much business could they ship any distance at the rates the Eastern men get. Perhaps, now that Mr. Huntington is coming here to live, he will see that a more liberal policy would increase our local manufacturing business and give his trains more East-bound freight. At any rate, it is to be hoped he will do something to remedy the present condition of affairs.

GEO. OHLEYER, one of the delegates to Washington from the California River and Harbor Convention, has returned. He reports that there is but little doubt the appropriations for the rivers and harbors in California will pass without pruning. About Caminetti's bill he is not very communicative.

THE Mechanics' Institute has appointed a committee consisting of Marsden Manson, A. S. Hallidie, M. A. Dorn, I. C. Stump and J. K. Firth, to assist in entertaining the American Society of Mechanical Engineers during their visit in this city.

The Late L. L. Robinson.

L. L. Robinson is dead. He died on Thursday at his ranch, Los Medanos, Contra Costa Co., after a long illness.

For many years this gentleman took the lead in the hydraulic mining fight in this State, and he was known to most of the miners of California. He was an aggressive man, and carried on the contest in an aggressive manner. It did not win, and as a result he was not as popular with the miners as when he first took the presidency of the old Miners' Association. But he spent a great deal of time and a great deal of his own money in fighting these debris cases, and brought into them a wonderful amount of energy and intelligent study. Mr. Robinson had his own ideas as to the way the contest should be carried on by the miners, and was somewhat impatient of contradiction. Those who were helping to pay the expenses did not always agree with him, so there was eventually some friction in the Association. It finally disbanded, when it became evident that the decisions were all adverse to the mining interests. By his immediate associates and those who knew him best, Mr. Robinson was well liked, and they speak highly of his many good qualities.

Mr. Robinson was originally a civil engineer, and came to California in 1854, where he built the first railroad on this coast—the Sacramento Valley road. He was the first president of the Giant Powder Co., and also president of the North Bloomfield Mining Co., of which, at the time of his death, he was the only survivor of the first Board of Directors of that famous company. He was also interested in other mining enterprises in this State. Mr. Robinson was unmarried and is understood to have left a large fortune.

THE EUREKA MILL BURNED.—The Eureka mill, on the Carson river, four miles from Dayton, was burned on the 21 inst. The mill, which is next to the largest in Nevada, cost \$350,000, and was worth at least \$125,000 at the present time. It was insured for about \$80,000. It was owned by Mackay and the bonanza people. Sixty men are thrown out of employment. The mill will probably never be rebuilt. The mill had 60 stamps, with a crushing capacity of 240 tons of ore in 24 hours. The only portion of the structure left is the iron work and the 30-inch Leffel water wheel that operated the machinery. The tailings that have accumulated represent a bullion value of several millions.

It is reported that the Bear Nest property on Douglas Island, Alaska, which a few years ago created considerable excitement in mining circles, both in Europe and America, is going to be thoroughly investigated this summer for the purpose of ascertaining whether the property has any merits, or is the stupendous fraud which it is now represented to be. About \$1,000,000 was lost in the speculation on this property.

DIANA.—At the annual meeting of the stockholders of the Diana Mining Company, 84,935 shares were represented and the following officers elected for the ensuing year: W. C. Ralston, President; Thomas Cole, Vice-President, and M. A. Jackson, William Bowers and George C. Hickox, Directors. R. R. Grayson was reelected Secretary and H. W. Coffin Superintendent.

In the Idaho mine, Grass Valley, 1900 level is looking very well. It is satisfactory to the owners. It is believed, for good reasons indicated in appearances, that the 2000 level will develop a good sized and a paying ledge. This is the deepest gold mining in the country.

WILLIAM PICKETT, for many years superintendent of the Quijotoa mines, has resigned, owing to ill health and the advice of his physician. D. C. Pickett has been elected as superintendent in his place.



UNDERGROUND WORKINGS OF THE STANDARD CONSOLIDATED MINE, BODIE, CAL. (SEE NEXT PAGE.)

The Standard Consolidated Mine.

The bullion product of the Standard Consolidated mine, at Bodie, for the last fiscal year was \$237,995, from which two dividends were paid. They disbursed, among other expenses, \$73,419 for mine labor, and for mill labor, \$26,646. The narrow ledges in this mine furnish, oftentimes, high grade ore, but not in sufficient quantity to keep the 20 stamps supplied, especially since the crushing capacity of the mill has been increased to 100 tons per month by the introduction of tin-punched screens. It is, therefore, essential to have available some considerable quantity of ore easy of extraction, even though it be of low grade, as mixing with the higher grade ore referred to, gives a good milling value.

This mine was first opened by an incline shaft, and levels established therefrom at distances apart, on the slope, of from 100 to 150 feet. Subsequently, the vertical shaft located on the western portion of the claim was sunk, and levels run to connect with the existing incline levels, which connections were sometimes accurately made, and sometimes otherwise.

In a mine of this character, a network of ledges, where so much work has already been done and no accurate record kept, there must necessarily be a certain amount of groping in the dark, with the ever-present contingency of stumbling on old stopes on ground supposed to be virgin. To guard against this requires the prosecution of an amount of prospecting work far in excess of the ordinary conditions in mining, and makes imperative the investment in this work of a very considerable portion of the monthly earnings.

The appended maps show the past year's work in the mine and are taken from the annual report of the manager, Thos. H. Leggett. A great deal of work has been done on the 300-foot shaft level (242 feet from the shaft collar). From the top of the wide upraise from the Bulwer level, marked "double-chute" on the map, a crosscut was driven east, encountering, within 40 feet, the top of an old stope on the third south ledge, in which remained rich ore, from 18 to 24 inches wide, that had never been stoped, and it is to this rich ore, chiefly, that the good bullion product of March to June, inclusive, is due. Drifts were opened here on this level southward, connecting with the main south crosscut and Jacob Klein ledge, and northward through old stopes of the third south ledge. These remnants of former rich stopes were worked out last June.

The north drift was continued 77 feet to its intersection with an old east and west crosscut, as shown on the map, and in following a narrow six-inch seam eastward into the footwall, it opened out into a body of ore from 18 to 30 inches wide, assaying \$70 per ton.

It is a noticeable fact that many of the intermediate ledges that have a regular strike of nearly north and south in the southern and western portion of the mine, turn abruptly to the east as they near their northern limit at about the central portion of the claim, forming a sort of horizontal "saddle," with often good ore bodies at their eastern extremities. This is markedly the case in the "West Bullion" ledge. In opening out this ledge toward the north, the western extension of the main crosscut was cleared out, and also the short northern drift at its extremity.

From here, Raise No. 7 was driven 64 feet, tapping the ledge at the bottom of the "Bulwer" stope, at the top of which the ore body was 6 and 7 feet wide. Driving north at the top of the raise for about 70 feet, showed the vein making an abrupt turn to the east at this, its northern extremity, with the ore body lying nearly flat, and averaging 5 to 6 feet between walls. This ore, however, was not as high grade as in the steeper portion of the vein, through

which Raise No. 7 was continued until 130 feet above the 300-foot level.

Here has been one of the most important developments in the mine during the past year, this ore body alone having furnished fully 4000 tons of ore since August last. The entire stope is timbered with square sets, in places over two sets wide.

Raise No. 8, from the 300-foot level, has opened up that portion of this West Bullion ledge lying between Raises Nos. 4 and 7, and they are still extracting a fair grade of ore from here.

There are still several hundred tons in sight in these stopes (7 and 8), with good chances of encountering more in the same vicinity.

In the Bulwer of 350 foot shaft level there has also been much exploration work done in the past year and it has met with very fair success. A main drift has been cleared out and continued for several hundred feet through the old 3rd South ledge stopes, and crosscuts were run but no new ledges were found. Winze No. 1 was sunk on the Hanging vein (the main vein being stoped out) and with this, winze connection has been made through raise B of the 400 level. This makes available some 600 or 800 tons of ore on which very little stoping has been done.

On the 400 shaft level the chief work has been done on the 4th South vein, and on several flat east and west feeders, south and east of the V (see map). Prospecting, south of the V, developed a flat east and west ledge with some high grade ore. Later, the ledge was opened up below the line, but the ore is of too low a grade to mill. The southern portion of this level yielded ten years ago much rich ore, but the ground had been pretty thoroughly prospected and worked.

On the 550-foot inclined level but little work was done last year, though more ore is now coming out.

Extraction from the large body of low-grade ore opened up in the far northern portion of the 500-foot shaft level has been going on steadily the past year, and there still remains in the top of the stope near the 400-foot level, 500 to 600 tons of the best ore; the grade of which improves going upward. No work has been done on any of the lower levels as they were thoroughly prospected years ago, without a single discovery of value being made. The veins, many of them, gave out before the 700 foot level (697 feet from the shaft collar). One or two of the main fissures can be traced in this level, but the vein filling is clay and decomposed wall rock without a vestige of ore, and seldom if ever any quartz. Work is therefore confined to the productive zone above the 500-foot level.

Mr. Leggett states that the company has "in sight" in the stopes, at present time, over 3000 tons of ore, not taking into account that which the old stope fillings will furnish, amounting certainly to hundreds of tons. Ore "in sight" means that quantity which is available without any further prospecting work, and while at present there would be but a few months' supply should such work cease, the vigorous exploration that has been and is carried on unceasingly, bids fair to maintain proper ore reserves for some time to come. In the 500-foot level, half way between this and the 400-foot level, they are crosscutting the territory in the southern part of the mine, that most abundant in rich ledges, with good chances of finding some unworked portions of these.

In the 400-foot level they are exploring a promising feeder or branch vein of the old "Main Standard" ledge that carries four feet of good ore close to the main vein, and toward the south for the few feet thus far driven on it, holds 14 inches wide in ore above the average grade. In the 350, or Bulwer line, they have virgin ground of promising character east of the Grant ledge. In the 300 level they are driving a crosscut in a field hitherto totally unexplored, lying just west of the shaft, and this Mr. Leggett

considers to be especially promising ground for encountering ore bodies of old-time size and quality.

The ore reserves in the mine are sufficient for present needs, exploration work is being diligently pushed in promising sections, and the milling work is steadily improving, which latterly each month has shown a greater margin of profit. The outlook for the continuance of quarterly dividends is considered a fair one; but until new unworked ledges are discovered in the mine, no positive assurances can be given in regard to this.

Mr. Leggett's report is quite complete and gives all necessary details for the information of the stockholders. But the printer persists in calling a "winze" a "wing," a "screen" a "screw," and otherwise shows complete ignorance of mining terms. The tabular work, too, is rather odd in the results. In the November and December returns, the printed figures show respectively \$18,215 and \$17,949 obtained from the tailings, while they got nothing at all out of the ore itself. Of course Mr. Leggett did not write it that way, as the total footings show.

Assessment Notices.

OCCIDENTAL CONSOLIDATED MINING COMPANY.
Location of principal place of business, San Francisco, California; location of works, Silver Star Mining district, Storey county, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 6th day of April, 1892, an assessment (No. 10) of Twenty-five cents (25c) per share, was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room No. 69, Nevada block, No. 309 Montgomery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 9th day of May, 1892, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 31st day of May, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

ALFRED K. DUBROW, Secretary.
Office—Room No. 69 Nevada Block, No. 309 Montgomery St., San Francisco, California.

DELINQUENT SALE NOTICE.

KEYSTONE CONSOLIDATED MINING COMPANY,
Location of principal place of business, San Francisco, California. Location of Works, Amador City, Amador county, California.

Notice—There are delinquent upon the following described stock, on account of Assessment (No. 2) levied on the 9th day of March, 1892, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cent.	No. Sh. res.	Amt.
A. B. McCree	8	2,334	\$5,835 00
A. B. McCree	6	134	335 00
A. B. McCree	57	533	1,332 50
A. B. McCree	59	99	247 50
A. B. M. Cree	114	100	250 00
John Clement	102	134	335 00
M. J. McDonald	129	200	500 00
M. J. McDonald	137	500	1,250 00
E. D. Rue, Trustee	138	925	2,312 50
Wm. Letts Oliver	133	40	100 00

And in accordance with law, and an order of the Board of Directors, made on the 9th day of March, 1892, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, No. 310 Pine St., room 43, San Francisco, California on MONDAY, the 9th day of May, 1892 at the hour of 12 o'clock m. of said day, to pay said delinquent Assessment thereon, together with costs of advertising and expenses of sale.

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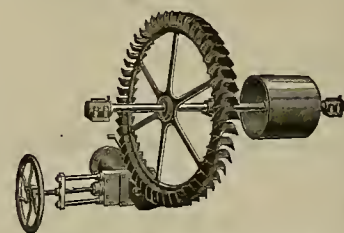
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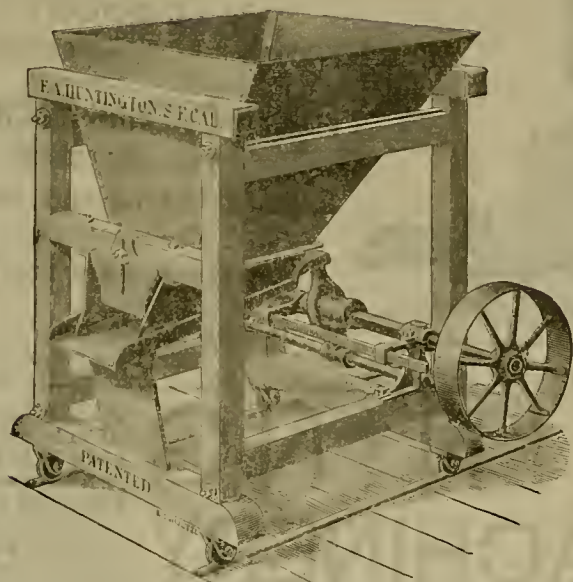
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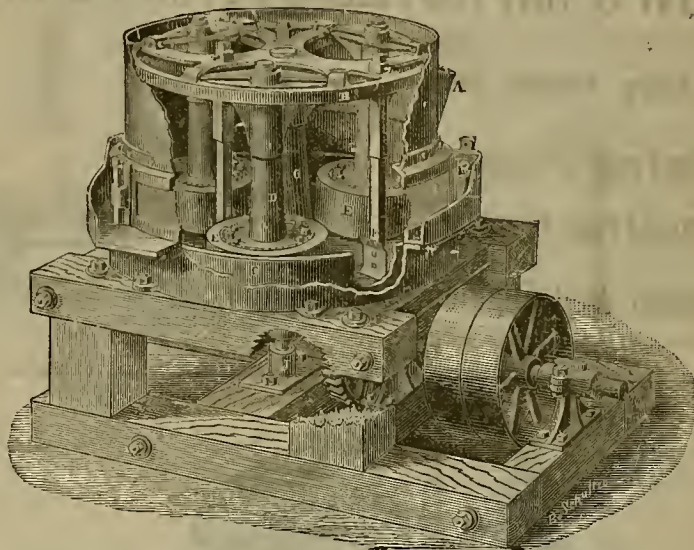
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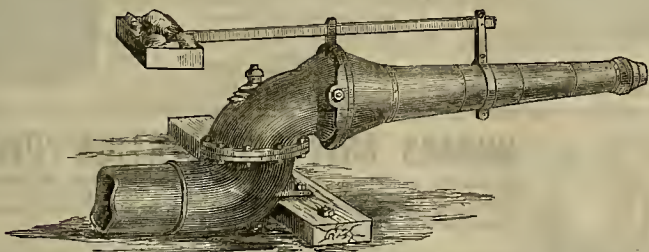
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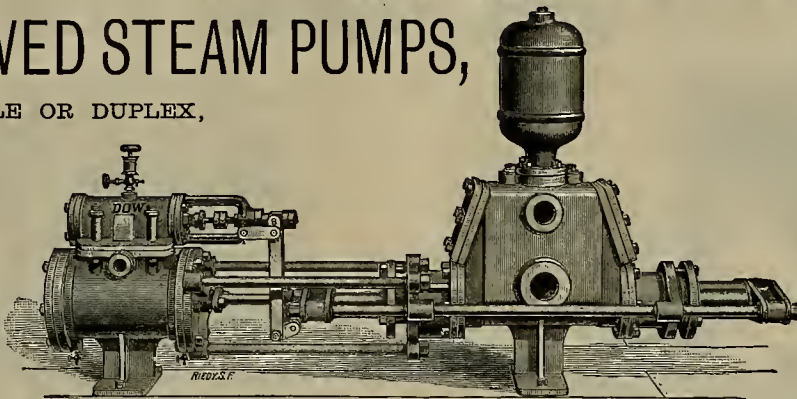
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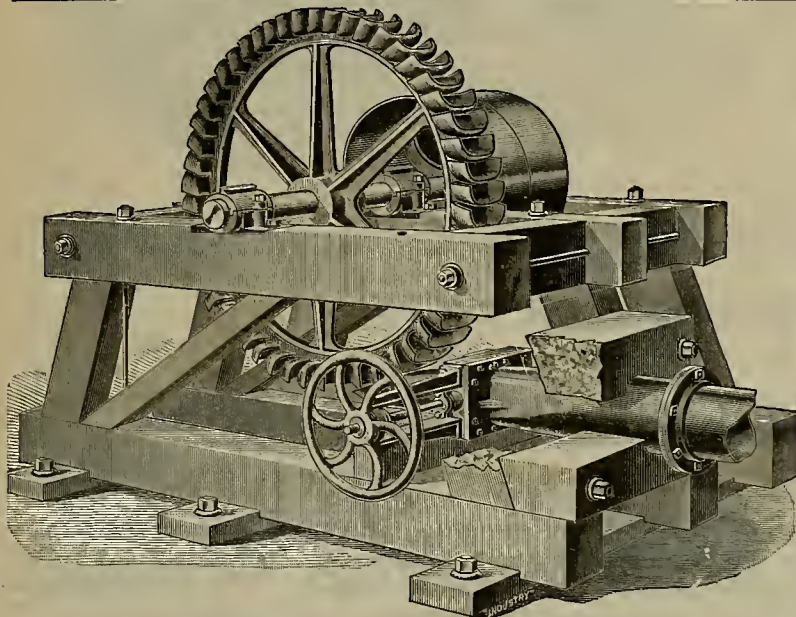
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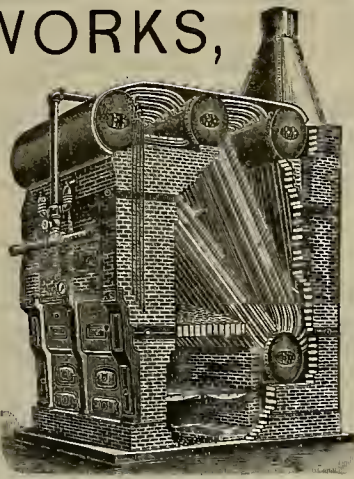
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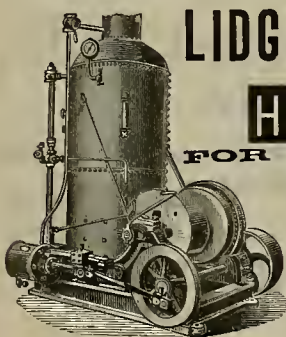
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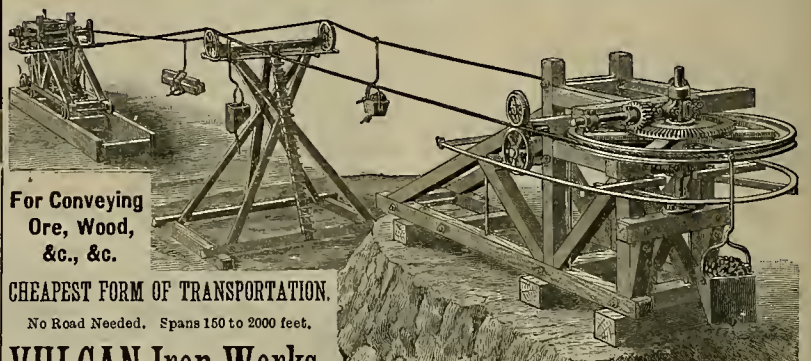


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List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING APRIL 26, 1892.

- 473,441.—TRUCK ELEVATOR—C. & I. Baker, Santa Ana, Cal.
473,652.—CABLE RAILWAY SWITCH—Bishop & Bell, S. F.
473,725.—ORE CRUSHER—E. H. Booth, S. F.
473,611.—SAFETY GAS COCK—Joseph Clark, S. F.
473,656.—POCKET CASH ACCOUNTANT—James Davis, S. F.
473,657.—ENOINE—M. B. Dodge, S. F.
473,734.—MINING COAL—P. C. Forrester, Wilkeson, Wash.
473,735.—FEED TROUGH—E. B. French, Oakland, Cal.
473,549.—DRILLING MACHINE—W. Gebring, San Diego, Cal.
473,872.—ANIMAL EXTERMINATOR—G. Gillpatrick, Martinez, Cal.
473,625.—DOOR—W. T. Gregg, Lakeport, Cal.
473,552.—FILINO PRESCRIPTIONS—W. R. Hall, S. F.
473,838.—FRUIT-PITTING MACHINE.—Thos. Harding, San Jose, Cal.
473,664.—INCUBATOR—Edmund Harrison, Tulare, Cal.
473,755.—LUBRICATOR CUP—Henry Ives, S. F.
473,756.—PLANT FRAME—E. K. Jones, Fort Bragg, Cal.
473,640.—SCREW THREAU CUTTING MACHINE—H. W. Pudan, Sacramento, Cal.
473,643.—DRINK MIXER—R. D. Schroeder, S. F.
473,644.—CONCENTRATOR—A. Schulenburg, S. F.
473,791.—PUNCH—F. N. Simmonds, S. F.
473,646.—CIGAR AND ASH HOLDER—Tibbitts & Sadler, Sutter Creek, Cal.
473,719.—CASH REGISTER—R. W. Whitney, S. F.

The following brief list by telegraph, for April 19 will appear more complete on receipt of mail advice:

California—George W. Stevens, San Francisco, fruit carrier; William J. Thomas, San Francisco, balance scale; Charles W. Weston, fruit box; Lowell J. Gilman, Santa Rosa, pruning implement; Clarence V. Heath and A. G. Miller, Sacramento, car ventilator; Ellsworth D. Meddelauff, Stockton, riveting machine; Wells H. White, Los Angeles, vehicle hub; Washington—Elbert Della Sprague, electric lamp hanger; Robt. Frost, Olympia, blotting pad; Remembrance L. Kirby, Pomeroy, riding harrow; Albert P. Vesen, Seattle, musical instrument.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

CONCENTRATOR—Adolph Schulenburg, S. F. No. 473,644. Dated April 26, 1892. This invention relates to certain improvements in apparatus for concentrating material which carries gold, amalgam, sulphurets, and other valuable material, and it consists in a novel combination of inclined tables, so arranged with relation to each other that valuable material of various weight and fineness is gradually separated from the lighter and worthless stuff and collected in proper receptacles. The tables and surfaces are so mounted as to receive a shaking and oscillating motion, and are also subjected to a percussive action which aids in the operation. Much of the novelty lies in the peculiar arrangements of the inclined tapering tables and the channels between them, not to be well understood without illustrations.

INCUBATOR—Edmund Harrison, Tulare, No. 473,664. Dated April 26, 1892. This incubator consists of an exterior double-walled, non-conducting case, with interior arrangements for a series of tanks to contain hot water, while the egg-containing trays are placed within the spaces surrounded by these water tanks. By reason of the capacity of water to retain heat, it is found that the water tanks thus inclosed will retain approximately a certain degree of heat for twelve hours, and by connecting the tanks with an exterior lamp-heated boiler, it can at any time be raised to a proper degree by a short application of heat to the boiler. Beneath the case is a brooder for young chicks, receiving its heat from the egg compartment, by reason of a thin conducting partition or floor between the two.

CASH REGISTER—R. W. Whitney, S. F. No. 473,719. Dated April 26, 1892. This is an improvement in that class of devices known as cash registers, and employed for the purpose of keeping an account of all amounts which are received, and in connection therewith of a money drawer which is operated so as to be opened by the operation of the register.

DRINK MIXER—Richard D. Schroeder, S. F. No. 473,643. Dated April 26, 1892. This invention relates to that general class of machines for shaking liquids, and especially to that machine of this class patented by the same inventor, August 18, 1891. No. 457,938. The object of this invention is to simplify the general construction of the machine.

CABLE RAILWAY SWITCH—Ira Bishop and Arthur F. L. Bell, S. F. No. 473,652. Dated April 26, 1892. This invention relates to that class of switches especially adapted, by reason

of their control of the slot, to cable railways. It consists in opposing rotary sections of the slot-irons so mounted that the position of the space between them at one end shall always remain constant and in alignment with the leading main slot, and at the other end shall remain variable and be brought into alignment with the outleading main slot, or with the branch slot, according to the positions to which the sections are rotated. It also consists, in connection with said rotary sections, of the novel mechanism by which they are operated and the novel connections by which the track-switch is operated simultaneously with the slot-switch sections. The object of the invention is to provide a simple and effective switch for the slots of cable railways, accurate in its operation and adapted without fail to throw one slot fully open while the other is fully closed.

ENOINE—Miles B. Dodge, S. F. No. 473,657. Dated April 26, 1892. This improvement consists of a pair of cylinders placed end to end, having independent main and cut-off balanced valves and pistons, joined together by a trunk which passes through the intermediate head between the cylinders, so that steam is first admitted alternately into the spaces around the trunks to act as a high pressure against the smaller area of the pistons, and is thence conveyed through the valves to the larger area at the opposite ends of the pistons and expanded therein for the return stroke of the pistons. By the operation described in the patent the inventor provides a very complete and serviceable double engine, with great economy in the use of steam.

MACHINE FOR CUTTING SCREW-THREADS ON BOLTS—H. W. Pudan, Sacramento, No. 473,640. Dated April 26, 1892. This invention is intended to increase the output of bolt-cutting machines, while, at the same time, reducing the amount of labor necessary for the purpose. The invention is designed to be applied to any bolt-cutting machinery. In the patent it is shown as adapted to what is known as the "National Bolt Cutter," and it is designed to cut screw-threads upon three-quarter track-bolts, which have a thread cut about two inches upon the end of the bolt, and in which that portion of the shank adjacent to the head is made flattened or oval in section, so that the bolt may be held fast while the dies are cutting the thread upon its end.

LUBRICATOR CUP—Henry Ives, S. F., assignor to A. W. Sanborn. No. 473,755. Dated April 26, 1892. This device for lubricating the moving parts of machinery consists in the combination, with a cup or receptacle for holding the lubricant, of a valve-chamber, a valve opening downwardly therefrom and from the receptacle, and a means for regulating and controlling the opening of the valve. With this device, the flow of the lubricant may be accurately regulated to suit the conditions under which it is to be used.

POCKET CASH ACCOUNTANT—James Davis, S. F. No. 473,656. Dated April 26, 1892. This device consists of a cylinder having a series of rings or sleeves fitted to its exterior surface and movable around it, these rings having figures or characters by which the debtor and creditor sides of an account may be indicated, together with dates and other matter connected therewith. The object of the device is to keep the account of receipts and expenditures in a mechanical manner, either permanently or to be transferred to books at certain stated times, if desired.

CIGAR AND ASH HOLDER—E. A. Tibbitts and C. W. Sadler, Sutter Creek, Amador Co. No. 473,646. Dated April 26, 1892. This device is a cigar and ash holder and furniture protector. Persons who smoke are in the habit of laying their cigars upon any convenient piece of furniture, as the edge of a table or desk. The wood-work is thus charred and the ashes of the cigar fall upon the carpets. This device is intended to protect the furniture, to provide a convenient support or holder for the cigar and a receptacle for the ashes which fall from its end. It consists of a corrugated, grooved or channeled plate, with a connecting clamp and screw, whereby it may be adjustably attached to the edge of a table, and a holder swiveling on the clamp so it may be concealed beneath the table or swung out under the end of the cigar to catch the ashes from the cigar resting on the plate.

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OFFICE OF THE PACIFIC COAST BORAX COMPANY, San Francisco, April 30, 1892. At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 17) of One Dollar (\$1.00) per share was declared, payable TUESDAY, May 10, 1892, at the office of the company, No. 230 Montgomery St., Rooms 11 and 12. Transfer books will close May 5, 1892, at 3 o'clock, P. M.
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Table of Contents:
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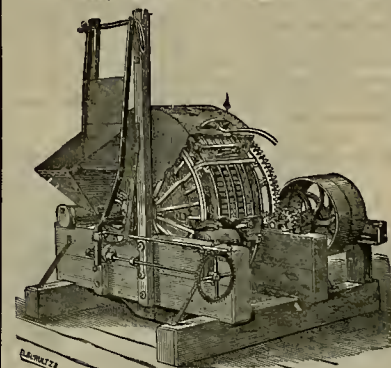
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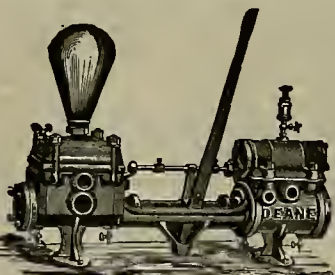
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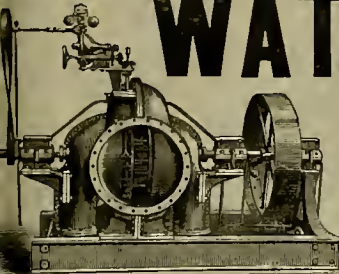
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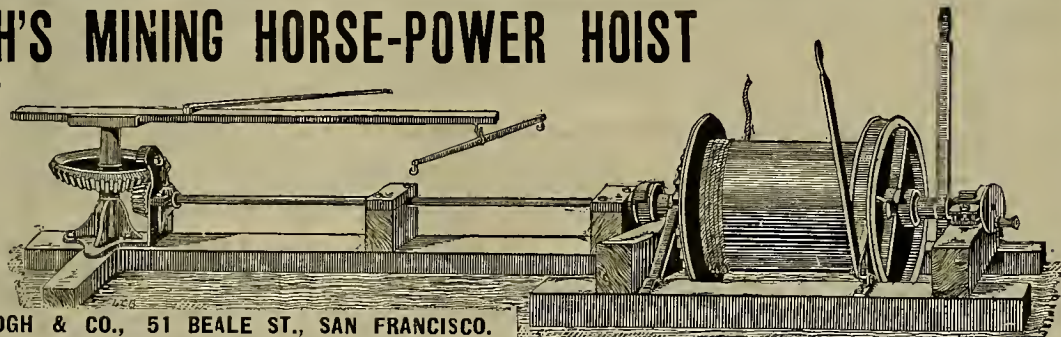
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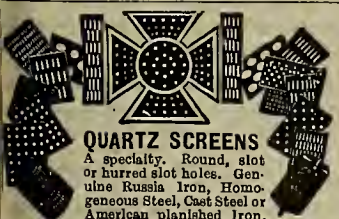
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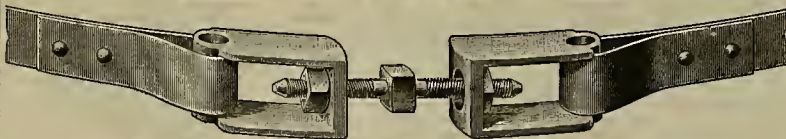
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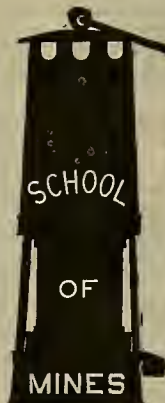
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 5, 1892.

Rains and cool weather the past week have changed the complexion of things from a commercial point of view. A large number of localities where little or no grain was expected to be harvested, now promise a fair yield, while sections where only a fair yield was looked for, now give promise of a full average. The improved condition of growing crops is a source of congratulation, and is calculated to inspire confidence with the trade. General business is about as heretofore reported, but with clearing weather a large increase is looked for in the volume of goods which will be sent out. Iron workers report fair to active business. The local money market continues easy, with a plethora of funds reported, owing to the absence of any large speculative or legitimate demand. There is a decided improvement and building boom on in the different cities and agricultural districts in this State. This gives employment to a large number of mechanics and other laborers, besides calling for considerable sums of money; but the latter soon finds its way back into the general reservoir to be again put out for the same purpose. State laborers are busily employed, which looks well for the State's future prosperity. We doubt very much if there was ever before a year in which laborers in this State were so generally busy as they now are.

In referring to the financial situation at the East, Iron Age of April 28th says that the accumulation of money at commercial centers is about the same as in the fall of 1891. The market is either distrustful or fails to discover opportunities for profitable investment. The most notable feature is the state of foreign trade, imports having quite recently become disproportionately large. At the same time, the exports are declining, and apparently, as a natural consequence, another outward movement of gold has commenced, but a leading New York banker remarks, "It is safe to say that the amount yet to go forward will not exceed \$15,000,000." According to another, gold exports are caused by disturbances on the European Continent rather than the condition of trade at home. The deplorable state of Italian finances may be a sufficient explanation. At the same time, Austria and Hungary are contemplating a measure of financial reform, to be submitted to Parliament early this month, which places a premium of 10 percent on gold taken in payment of custom duties. In April, 1891, the shipment of gold averaged over \$4,000,000 a week, and in May the loss was \$30,000,000. Our Eastern and European mail advices look very much as if the money markets are being manipulated by a strong financial syndicate.

SILVER—The Government completed its purchases of fine silver for April on the 27th ult. The awards for the month were as follows:

Date.	Price.	Ounces.
April 1.....	\$87.50 to \$7.58	325,000
April 4.....	\$7.58 to \$7.58	494,000
April 6.....	\$7.58 to \$7.58	220,000
April 8.....	\$7.58 to \$7.58	224,000
April 11.....	\$7.58 to \$7.58	291,000
April 13.....	\$7.58 to \$7.58	420,000
April 15.....	\$7.58 to \$7.58	60,000
April 18.....	\$7.58 to \$7.58	245,000
April 20.....	\$7.58 to \$7.58	58,000
April 22.....	\$7.58 to \$7.58	58,000
April 25.....	\$7.58 to \$7.58	380,000
April 27.....	\$7.58 to \$7.58	225,000

Public awards.....4,019,000
Private purchases.....481,000

Monthly quota.....4,500,000
Purchases for account of May were commenced on the 2d. The size of the offerings last month varied from 190,000 ounces on the 15th to 941,000 ounces on the 22d.

The markets at home and abroad show more strength, yet there appears to be a mixture of uncertainty which makes it difficult to predict the future. English mail advices report a large balance due India, which will have to be met by silver shipments to that country. Besides this, there have been very heavy sales of Indian wheat for shipment to England and the Continent, and a low price for silver, this will also necessitate the buying of silver. When the market is entered to meet the above requirements, the market value of silver is very apt to make rapid advances. In other words, it looks as if silver has been cornered with the view of making short sellers pay dearly for their temerity.

MEXICAN DOLLARS—The market is dull but firmer at around 69 1/2 cents.

QUICKSILVER—The market is weak at quotations. Receipts the past week aggregate 106 flasks, and exports by sea 75 flasks to Mexico. The exports the past month by sea aggregate 355 flasks. For the first four months of the year the exports aggregate 376 flasks, distributed as follows: To New York 2100 flasks, Mexico 1015, Australia 387, British Columbia 200, Central America 39, and New Zealand 20.

LIME—Receipts the past week aggregate 1832 bbls. There is a continued few demand.

ANTIMONY—The market shows a firmer tone in sympathy with the East. New York mail advices quote as follows: 10.85@11c for Hallett's, 12.25@12c for LX and 14.75@14c for Cookson's, and 13c for Crown brand.

BORAX—Exports by sea the past week aggregate over 400 ctns. to New York. We are informed that the East is making more liberal calls on this coast for supplies.

LEAD—The market is steady. New York mail advices report as follows: Consumers in this vicinity are extremely conservative buyers, and that fact seems to be somewhat of an obstacle in the way of advancing prices. It is the fact, however, that the available supply on the spot is unusually light, and offering from the sources of supply seems to be unusually reserved as well, indicating a strong position superficially at least.

TIN—Imports the past week include 20,767 boxes of plate from Liverpool. The market for both pig and plate shows considerable strength. English cables report as follows: "Tinsplate market remained quiet. Inquiries plentiful and large lines offering, but prices are unsatisfactory. Shipments are heavy. The Landore Tinsplate Company, Swansea (seven mills), have suspended. Three Welsh firms, it is reported, contemplate erecting tinsplate works in the United States."

PIG IRON—The market is fairly firm for foreign, in sympathy with European advices. American spot, on passage or for shipment buyers favorers. Iron Age, in its review of the New York market, reports that "the domestic iron trade continues gloomy and depressed. Chicago and Detroit are the only markets in which pig iron has been at all active. Pittsburgh reports that the movement to shut down furnaces has come to a stop, and it is now given out that furnacemen making mill iron have an understanding to hold the price at \$12. A case of Bessemer pig is reported at \$13.75 at furnace in Wheeling district. A large order for domestic Ferro is reported taken at \$61, Pittsburgh, an exceptionally low price. Billets are weak."

COPPER—The market exhibits a steadily growing strength, but with no advance as yet in quotations. New York mail advices report a continued heavy consumption. London cables report a strong market,

New York market is quoted as follows: Arizona ingot at 11 1/2c, and common casting brands are valued at 11 1/4@11 3/4c.

COKE—Imports the past week aggregate 406 tons from Swansea. The market is fairly steady at quotations.

COAL—Imports the past week aggregate as follows: Nanaimo 5907 tons, Glasgow 2460, Leparture Bay 2520, Tacoma 4700, Seattle 2401, Coos Bay 500, Swansea 3100, Baltimore 3000, Newcastle, N. S. W., 4269. Total 28,687 tons. The market is dull and heavy for all descriptions. Imports are free, while the demand is brisk. Heavy rains and improved crop prospects are against the market.

Mining Share Market.

SAN FRANCISCO, May 5, 1892.

The market the past week was relieved of its moribund downward tendency, by small upsurges. Many chippers and outside traders took advantage of the small upsurges to short the market. They wished to make a deal, changes in the personnel of the officers of several of the mines would be made and the working of the mines and milling of ore would be carried on to conform to the law under which the companies incorporated. The Hale & Norcross management is the only one that furnishes weekly letters which fully comply with the law. Outside operators must not labor under the impression that mine superintendents in giving full detailed reports of the work done in the mines and in the milling of ore, will bring the millennium for them and that they will roll in wealth; for unless the ore is in the mine, dividends cannot be declared and paid. Silver mining is very expensive, considerably larger than the rule of gold mining. While saying this it is only North End mines and of Hale & Norcross and Savage mines is doing hard work to correct the many abuses which have crept into the system of mining and milling of ore, in vogue on the Comstock lode. These abuses cannot all be rectified in a day, or in a week, or even in a month; they have to be taken in rotation, and, therefore, requires time. Besides correcting the abuses on the Comstock, the management above referred has had and is now having experiments made with the refractory and also low grade ore by which they can be reduced and be made to pay a handsome profit over and above the cost; whether anything will come out of the experiment is as yet an open question.

In outside mining shares the market has been dull. Nevada Queen, one of the Tuscarora district mines, has shown considerable life and gradually advancing prices. Who knows but what the shares in this mine will pull outside shares out of the net into which they have drifted. The Bodies have ruled dull but steady. The Quilotos continue worthless except to mine officers who draw salaries.

The Comstock mill, which was running on Con. Virginia ore, was burned up last Tuesday. The loss of the mill is not felt, for there are several idle mills which can be used. Formerly we had fires in the mines and loss of life, but now we are treated to fires on the surface with loss of money to the miners.

Several brokers have notified customers to take up their accounts. This action of the brokers added to the general depression of the market, many holders had to sell. Who bought the shares forced on the market is a conundrum to many. With the share market so dull it seems to be a waste of both time and space to give much information from the mines. That the mines were never before in better condition for economical working, goes without saying, but in retaining such men as one of the officers of the Hale & Norcross in responsible office in their companies, looks as if the mill rings neither fear man or devil while in pursuit of bullion and securing mining shares cheap. The recent strike reported in Mexican is said to be improving. The joint west cross drift, 900-foot Union level, is said to have run into a new and favorable formation. If this cross drift was started with the Union shaft as a basis for calculating distances, then they are about up to a line with Scorpio, but if the Sierra Nevada shaft was taken as a basis, then they are near the ledge in its downward continuation from the west croppings. The recent find in both Potosi and Bullion is richer than officially reported. In Belcher, the recent strike to the west on the 300-foot level did not give cause for much optimism. Very encouraging news comes to hand from two of the Gold Hill mines, but then several of the companies will probably have to levy assessments before the rings can manage the shares in that end.

From the outside mines, news of the most encouraging character comes to hand from the Bodies. It looks as if several mines in that district will pay regular dividends. The "Razor Blades" the usual high-colored reports come to hand, which, perhaps, means more suicides if gudgeons buy the shares.

Mining shares opened weak and dull this morning. Points are out for lower prices before there is much in the market.

San Francisco Metal and Coal Market.

THURSDAY, May 7, 1892.

Per lb.	Per ton.	Per ton.
BORAX.....	@ 14	English, lb..... @ 19
Refined, fine lots.....	@ 8	Oanton tool..... @ 9
Concentrated, do.....	@ 7 1/2	8 1/2" Diam tool..... @ 9
All grades jobbing at advance.		Do, do, do..... @ 9 1/2

Per lb.	Per ton.	Per ton.
COPPER.....	@ 22	S. V. steel grade..... @ 6 00
Bolt.....	@ 22	Ingots, 14..... @ 6 00
Sheet.....	@ 22	Do roofing, 14x20..... @ 6 00
Do, wholesale.....	@ 22	Do, do, 20x28..... @ 12 00

Per lb.	Per ton.	Per ton.
IRON.....	@ 32	Spot @ 10..... @ 23
Bar, base.....	@ 32	Spot @ 10..... @ 23
Norway, base.....	@ 32	Spot @ 10..... @ 23

Per lb.	Per ton.	Per ton.
PIG IRON.....	@ 32	Spot @ 10..... @ 23
Bar, base.....	@ 32	Spot @ 10..... @ 23
Norway, base.....	@ 32	Spot @ 10..... @ 23

Per lb.	Per ton.	Per ton.
PIG IRON.....	@ 32	Spot @ 10..... @ 23
Bar, base.....	@ 32	Spot @ 10..... @ 23
Norway, base.....	@ 32	Spot @ 10..... @ 23

Per lb.	Per ton.	Per ton.
PIG IRON.....	@ 32	Spot @ 10..... @ 23
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Bar, base.....	@ 32	Spot @ 10..... @ 23
Norway, base.....	@ 32	Spot @ 10..... @ 23

Per lb.	Per ton.	Per ton.
PIG IRON.....	@ 32	Spot @ 10..... @ 23
Bar, base.....	@ 32	Spot @ 10..... @ 23
Norway, base.....	@ 32	Spot @ 10..... @ 23

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNAL.

ASSESSMENTS.				
COMPANY AND LOCATION.	NO.	AMT.	LEVIED, DELINQ. AND SALE.	SECRETARY.
Alpha Cons M Co, Nevada.....	3.....	15c.....	April 14, May 18, June 8.....	C E Elliott, 309 Montgomery
Brumswick Cons M Co, California.....	3.....	2c.....	April 15, May 18, June 8.....	J Stadfeldt, Jr, 309 Montgomery
Bullion M Co, Nevada.....	3.....	2c.....	March 17, April 21, May 11.....	R R Grayson, 331 Pine
Confidence M Co, Nevada.....	2.....	75c.....	March 30, May 3, May 25.....	A S Groth, 414 California
Crown Point M Co, Nevada.....	57.....	60c.....	March 15, April 19, May 10.....	J Newlands, 331 Pine
Diana M Co, Nevada.....	8.....	80c.....	May 3, June 10, June 30.....	R Grayson, 331 Pine
Eclipse M Co, California.....	1.....	5c.....	April 23, May 25, June 15.....	O Tum-Suden, 402 Montgomery
Golden Fleece Gravel M Co, California.....	16.....	\$1.00.....	Jan 30, Mar 24, May 7.....	W J Gleason, 339 Montgomery
Golden Prize Cons M Co, Nevada.....	6.....	25c.....	Feb 23, May 7, May 28.....	C D Bena, 331 Pine
Gold Mountain M Co, California.....	2.....	42c.....	March 20, May 3, June 14.....	J F Orlie, 213 Grant Ave
Gray Eagle M Co, California.....	28.....	5c.....	April 14, May 23, June 14.....	A W Barrows, 303 California
Hale & Norcross M Co, Nevada.....	101.....	50c.....	Mar 24, Apr 28, May 20.....	A B Thompson, 349 Montgomery
Head Centre and Tranquility Co, Arizona.....	4.....	3c.....	March 14, April 19, May 12.....	J W Pew, 310 Pine
Justice M Co, Nevada.....	50.....	150c.....	May 2, June 6, June 27.....	R E Kelly, 419 California
Keystone Cons M Co, California.....	3.....	10c.....	March 22, April 26, May 19.....	J W Pew, 310 Pine
Keystone Cons M Co, California.....	2.....	\$2.50.....	March 9, April 19, May 9.....	J H I Ham, 310 Pine
Locomotive M Co, Arizona.....	15.....	5c.....	April 7, May 9, May 27.....	A H Fish, 309 Montgomery
Occidental Cons M Co, Nevada.....	10.....	25c.....	April 6, May 9, May 31.....	A K Durbin, 309 Montgomery
Original Keystone M Co, Nevada.....	9.....	10c.....	March 4, April 14, May 7.....	F E Lyle, 330 Pine
Sever Belcher & Mides M Co, Nevada.....	10.....	25c.....	April 8, May 12, May 31.....	E B Holmes, 369 Montgomery
Silver Hill M Co, Nevada.....	30.....	10c.....	March 31, May 1, May 25.....	D U Bates, 309 Montgomery
Siskiyou Cons Quicksilver Co, California.....	3.....	10c.....	March 15, April 26, May 19.....	E F Stone, 366 Pine

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Adams Hill Cons M Co.....	Annual.....	J N Pike, 320 Pine.....	May
Alma Cons M Co, Nevada.....	Annual.....	G L McCoy, 331 Pine.....	May
Commonwealth Cons M Co, Nevada.....	Annual.....	R B Grayson, 331 Pine.....	May
Evening Star M Co, California.....	Annual.....	J S Scoville, 330 Sansome.....	May
Gover Mining Co.....	Annual.....	R Mof Dobie, 13 Fremont.....	May
Little Joker M Co, Alaska.....	Annual.....	G W Sessions, 309 Montgomery.....	May
Mono Cons M Co, California.....	Annual.....	G W Sessions, 309 Montgomery.....	May
Scorpion M Co, Nevada.....	Annual.....	G C Spinning, 310 Pine.....	May
Silverado M Co, Nevada.....	Annual.....	S E Cox, Chronicle Building.....	May
Sitka M Co, Alaska.....	Annual.....	G W Sessions, 309 Montgomery.....	May
Unga M Co, Alaska.....	Annual.....	G W Sessions, 309 Montgomery.....	May

LATEST DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Cone Cal & Virginia M Co, Nevada.....	50.....	A W Havers, 309 Montgomery.....	Aug
Eureka Cons M Co, Nevada.....	25.....	H P Russ, 101 Sansome.....	Aug
Grass Valley, Nevada Co, California.....	1.00.....	A H Hough, 230 Montgomery.....	Apr
Standard Cons M Co, California.....	10.....	J W Pew, 310 Pine.....	Apr

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

BUTTE BELLE G M Co, April 25. Capital stock, \$3,000. Directors—James Gillman, Mark Strouse, A. W. Morgenstern, J. C. Boyd and Geo. C. Higgins.

HUNTON BAY CON. M. Co, April 25. Location, Grass Valley, Nevada Co. Capital stock, \$100,000. Directors—James H. Culver, Fred G. Cartwright and Austin Walrath, of this city, Alf Tregidgo of Grass Valley, and Geo. G. Allen of Nevada City.

HOME BUILDING CO, April 25. Capital stock, \$100,000. Directors—Julius A. Remmel and Geo. W. Shreve, of Alameda; Frank Shay, W. A. Harney, I. W. Ross, H. B. Soltan and O. W. Forsyth of this city.

DAVIS SELF-CLEANING WATER FILTER CO, April 27. Capital stock, \$100,000. Directors—Barclay Henley, Henry G. Meyer, Wm. Grosse, Chas. J. Swift, Chas. Sladky, James Herman and Joseph Davis.

PHOENIX M. & M. Co, April 20. Capital stock, \$500,000. Directors—John P. M. Harris, of Benton, Cal.; Arche Farrington, Reno (Nev.), L. A. Sanderson, Alfred K. Darbrow and Wm. C. Stadfield of this city.

HEWSON STEAM MOTOR CO, April 20. Object, to manufacture the Hewson rotary wheel engines. Capital stock, \$5,000,000. Directors—Robert Hewson, Joseph D. and Albert P. Redding, Joseph Wells and Alexander H. Rutherford.

AMERICAN EXPLORING CO, May 3. Object, to conduct a mining business. Capital stock, \$20,000. Directors—J. L. Rathbone, John H. Hammond, N. H. Harris, A. H. Ricketts and F. G. Corning.

MARTHA WASHINGTON M. Co, May 3. Capital stock, \$500,000. Directors—Mrs. Gertrude Smyth, Mrs. A. G. Watson, Mrs. M. A. Kenney, Mrs. Angie Griffiths, E. S. Morse, J. K. Burnett and J. E. Watson.

Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

ARIZONA MINES.	Dr.	Cr.
Crocker.....	\$21,923	
Peer.....	\$3,584	
Peerless.....	2,131	
Peerless.....	2,446	
Silver King.....	61	
Wellington.....	6,381	

BODIE MINES.	Dr.	Cr.
Bodie.....	4,516	
Bulwer.....	11,191	
Mono.....	1,421	
Summit.....	34,445	
Syndicate.....	1,208	
Syndicate.....	1,766	

COMSTOCK MINES.	Dr.	Cr.
Alpha.....	23,698	
Andes.....	22,517	
Belcher.....	5,331	
Benton.....	65,284	
Best & Belcher.....	19,265	
Bullion.....	2,065	
Caladonia.....	8,306	
Challenge.....	3,290	
Chollar.....	13,262	
Confidence.....	11,757	
Con. Cal. & Va.....	6,470	
Con. Imperial.....	630	
Con. New York.....	6,174	
Crown Point.....	28,980	
Eachus.....	14,034	
East Sierra Nev.....	372	
Gould & Curry.....	6,383	

TUSCARORA MINES.	Dr.	Cr.
Andes.....	22,517	
Belcher.....	5,331	
Benton.....	65,284	
Best & Belcher.....	19,265	
Bullion.....	2,065	
Caladonia.....	8,306	
Challenge.....	3,290	
Chollar.....	13,262	
Confidence.....	11,757	
Con. Cal. & Va.....	6,470	
Con. Imperial.....	630	
Con. New York.....	6,174	
Crown Point.....	28,980	
Eachus.....	14,034	
East Sierra Nev.....	372	
Gould & Curry.....	6,383	

MISCELLANEOUS MINES.	Dr.	Cr.
Alpha.....	23,698	
Andes.....	22,517	
Belcher.....	5,331	
Benton.....	65,284	
Best & Belcher.....	19,265	
Bullion.....	2,065	
Caladonia.....	8,306	
Challenge.....	3,290	
Chollar.....	13,262	
Confidence.....	11,757	
Con. Cal. & Va.....	6,470	
Con. Imperial.....	630	
Con. New York.....	6,174	
Crown Point.....	28,980	
Eachus.....	14,034	
East Sierra Nev.....	372	
Gould & Curry.....	6,383	

COAL.	Dr.	Cr.
Alpha.....	23,698	
Andes.....	22,517	
Belcher.....	5,331	
Benton.....	65,284	
Best & Belcher.....	19,265	
Bullion.....	2,065	
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Challenge.....	3,290	
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Crown Point.....	28,980	
Eachus.....	14,034	
East Sierra Nev.....	372	
Gould & Curry.....	6,383	

*Collecting assessment.

NOTE.—Norcross has unsold bullion on hand amounting to \$8446.22. Also 4500 pounds concentrates valued at \$353.30 per ton, and \$6673.50 in uncollected assessment. Con. Cal. & Virginia has unsold bullion valued at \$34,748.17. Michigan bullion valued at \$12,620.61. Nevada has \$16.80.

IRON PIPE

ALL SIZES, FOR GAS, STEAM AND WATER.

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SHEET IRON AND STEEL PIPE,

ALL SIZES,

For Water Supply, Mining, Irrigating Purposes, Stock Ranches, Etc.

Made in Lengths Desired from 16 to 30 feet.

The Cut shows a Section of Three Joints

DOUBLE RIVETED SHEET IRON PIPE.

In the manufacture of this Pipe, we use only a high grade of annealed Charcoal iron of great tensile strength. The weight or thickness of metal used, is graded according to service required, and pressure to which the Pipe will be subjected.

FOR ALL UNDERGROUND PURPOSES, we immerse the Pipe in a bath containing a special mixture of ASPHALTUM, BITUM and PETROLEUM, at a Temperature of 300° Fahrenheit. It thus receives a thorough coating, both inside and outside, rendering it impervious to the alkalies of the earth, rust, etc., and is practically indestructible.



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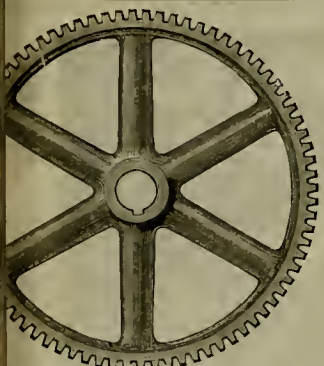
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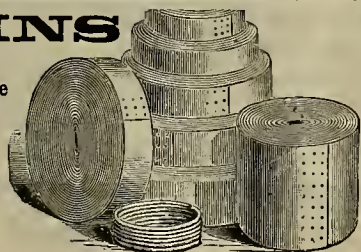
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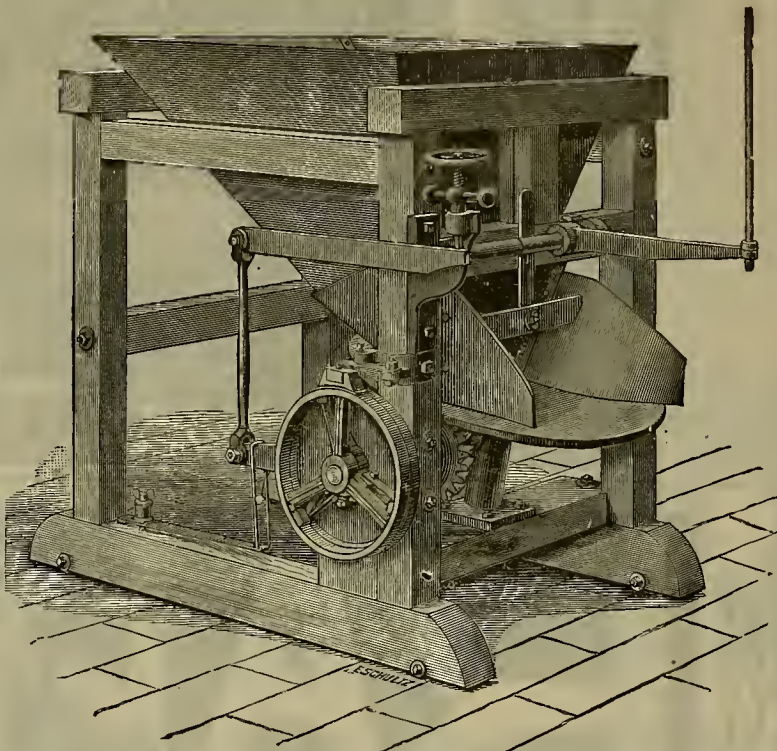
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"HENDY" IMPROVED "CHALLENGE" ORE FEEDER.

THE BEST FORM OF FEEDER EVER DEvised,

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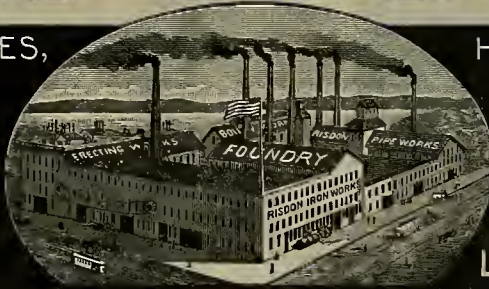
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A COMPLETE STOCK ON HAND
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WITH
NEW IMPROVEMENTS
UNEQUALLED REGULATION
HIGHEST ECONOMY.
SMOOTH & QUIET RUNNING.

SIMPLE CROSS COMPOUND TRIPLE EXPANSION TANDEM COMPOUND

THE BEST ENGINE FOR ELECTRIC LIGHTING ELECTRIC RAILWAYS ELECTRIC MINING ELECTRIC WELDING AND GENERAL MANUFACTURING PURPOSES.

AUTOMATIC CUT-OFF ENGINE

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SILVER-PLATED AMALGAMATED PLATES

For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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FRUE ORE CONCENTRATOR

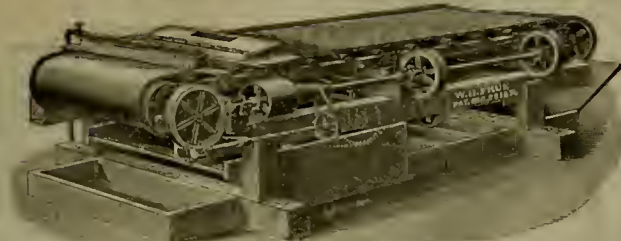
OVER 3200 IN ACTUAL USE.

Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.

OLADSTONE MINING COMPANY, C. J. Clark, M. E. Gen'l Supt.
MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIR: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puff-bled-up concentrators and have always found the Frue in first place. When I built this mill (20 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for Twelve Months. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four foot table and are as easily set as the smaller tables and have the advantage of 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, requiring no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has valued monthly from \$5 to \$20 per ton and the tailings from not 1¢ to 60 cts. per ton. I will conclude by saying that I cannot endorse the six foot Frue Vanner too highly, and it is the only table that I would have in my mill.
C. J. CLARK, Gen'l Supt.

For any information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO.,
No. 132 Market Street. San Francisco, Cal.



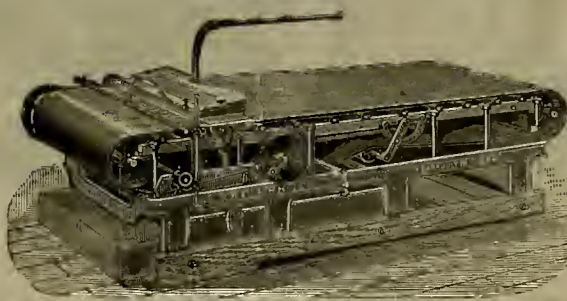
Price of 4-foot wide Plain Belt Frue Vanner..... \$550, f. o. b.
" " Improved Belt Frue Vanner..... 800, f. o. b.
" 6-foot " Plain Belt Frue Vanner..... 800, f. o. b.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs"; for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt..... \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt..... \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if used be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sanson, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.

GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.

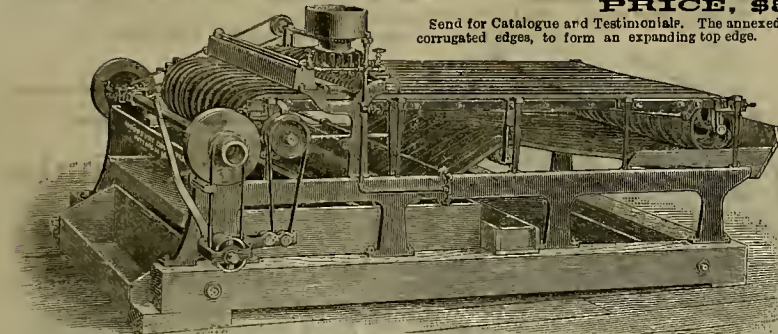
Signed] Supt North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

Was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THE CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of Best Steel and Wrought Iron. Strong and Durable.

PRICE, \$675, f. o. b.

Send for Catalogue and Testimonials. The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge.

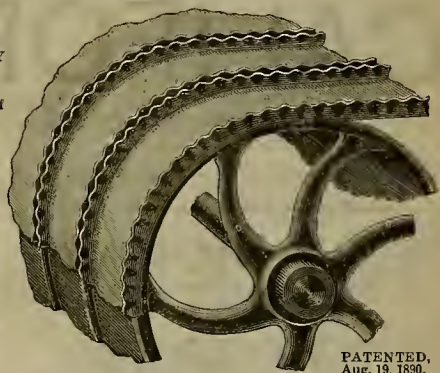


THE SAN JACINTO ESTATE—Office of the General Manager, CAJALCO, Oct. 30, 1891.
GEO. E. WOODBURY, Esq.—Dear Sir: I reply to yours of the 27th inst., respecting the working and efficiency of the "Woodbury" Concentrator placed in our works by you. I am pleased to inform you that it is giving entire satisfaction; it has a much greater capacity than any other machine and is doing fully one-third more work, with the concentrate usually clean, as from either of the machines it work here.
[Copy] Yours faithfully, S. HARRIS, Manager.

THE SAN JACINTO ESTATE, LIMITED—Office of General Representative, P. O. address, South Riverside, San Bernardino County.

CAJALCO, February 17th, 1892.
GEO. E. WOODBURY:—Your letter of inquiry about your concentrator came to hand in due course. Your machine is doing well, the motion is all right, and the machine is giving entire satisfaction. Yours faithfully, S. HARRIS.

GEO. E. WOODBURY, Man'r, 213 to 219 First St., San Francisco.



PATENTED, Aug. 19, 1890.

NATIONAL IRON WORKS

N. W. Corner Main and Howard Sts., San Francisco,

—MANUFACTURERS OF—

Stationary and Compound Engines, Flour, Sugar, Saw and Quartz Mill Machinery.

AMALGAMATING MACHINES. CASTINGS AND FORGINGS Of Every Description

ALL WORK TESTED AND GUARANTEED.

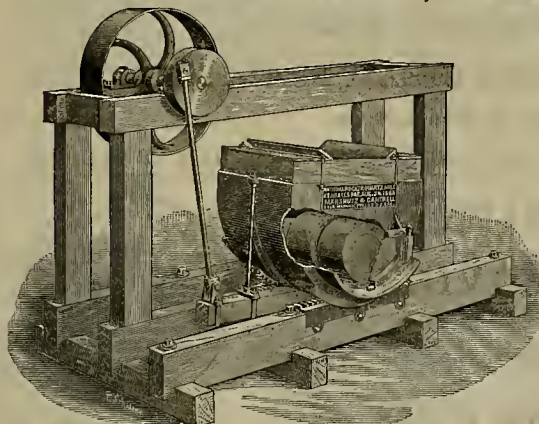
IMPROVED PORTABLE HOISTING ENGINES.

NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



Send for Circulars and Price List.

MARSHUTZ & CANTRELL.

The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

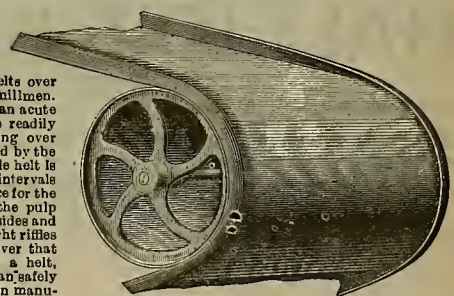
We challenge competition with Stamps, Ball Pulverizers or other ore crushing machines now before the public.

THE BLASDEL CONCENTRATING BELT COMPANY.

We have now made arrangements to have our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight riffled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from hooking on the sides and forming channels through the center. These slight riffles also serve very fine sulphurets and the quicksilver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better belt than has ever been manufactured for use on this coast. It will last much longer and will handle fully one-third more pulp than any smooth belt, and will save a high percentage of sulphurets.

H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.



RAND DRILL COMPANY,

ROCK DRILLING, AIR COMPRESSING, MINING AND QUARRYING

MACHINERY,

23 PARK PLACE, NEW YORK, U. S. A.



DEWEY & CO. { 220 MARKET ST., S. F. } PATENT AGENTS.
Elevator, 12 Front.

PARKE & LACY COMPANY,

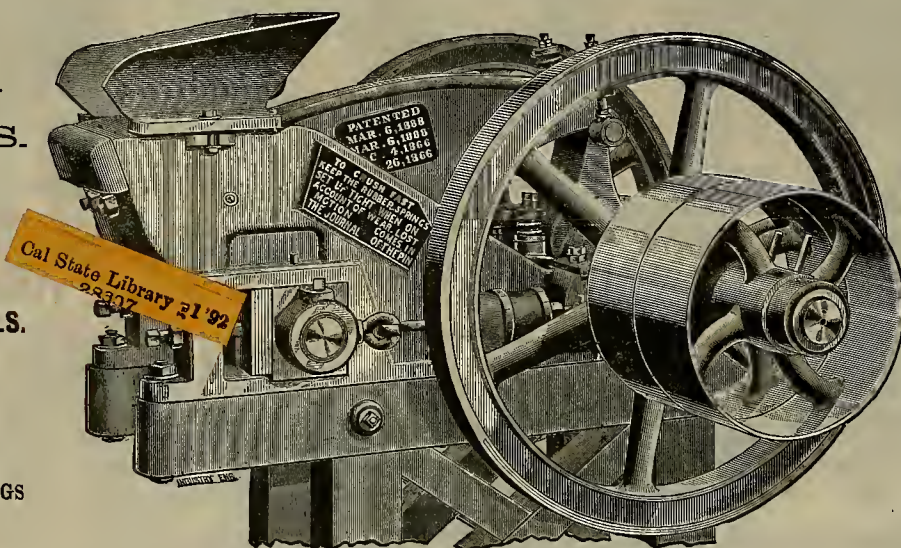
MINING, MILL and GENERAL MACHINERY.

ENGINES,
BOILERS.
PUMPS.

STAMP MILLS,
PULVERIZERS,
CRUSHING ROLLS.

ROCK BREAKERS,
CONCENTRATORS,
WET AND DRY JIGS

BULLOCK DIAMOND DRILLS.



DODGE IMPROVED ROCK BREAKER.

INGERSOLL - SERGEANT
ROCK DRILLS,
AIR COMPRESSORS

— AND —
COAL MINING MACHINERY.

WATER WHEELS,
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SAW MILLS,
PLANING MILLS,
MACHINE TOOLS

MILL AND MINE SUPPLIES.

GENERAL AGENT FOR WESTINGHOUSE AUTOMATIC ENGINES.

21 and 23 Fremont St., San Francisco, Cal. 187 and 189 Clarence St., Sydney, N. S. W.

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CALIFORNIA WIRE WORKS

LOS ANGELES AGENCY, LOS ANGELES, CAL.

PORTLAND AGENCY, PORTLAND, OREGON.

WIRE ROPES

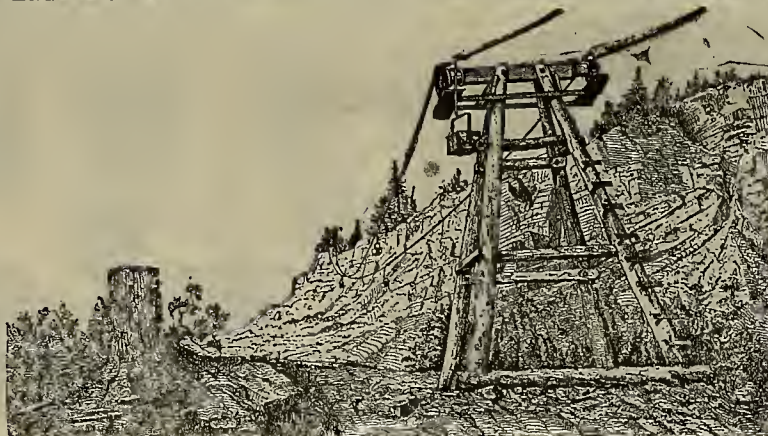
For Mining, Hoisting, Transmission
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WIRE CABLES

For Cable Railways, Etc.

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For Ships, Derricks, Etc.



WIRE of all kinds

Best Steel.

WIRE NAILS,

BARBED WIRE,

Regularly Licensed.

HALLIDIE'S PATENT WIRE ROPEWAY

FOR THE RAPID AND ECONOMICAL TRANSPORTATION OF ORE AND OTHER MATERIAL.

Erected by us during the past Fourteen Years in Spans of from 200 to 2000 feet. Simple, Economical and Durable. Have been Thoroughly Tested in all Parts of the Country.

SEND FOR ILLUSTRATED CATALOGUE.

SYSTEMS—"SLATTERY," INDUCTION, AND "WOOD," ARC.

FACTORIES—FORT WAYNE, IND., AND BROOKLYN, N. Y.

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— GENERAL AGENTS FOR CALIFORNIA, NEVADA, OREGON, ARIZONA AND WASHINGTON OF THE —

Fort Wayne Electric Co., Fort Wayne, Ind.

ELECTRIC DRILLS, PUMPS, HOISTS, ETC., FOR MINING PURPOSES, STEAM PLANTS, ETC., ETC.

Agents for INSULATED WIRES manufactured by the Simplex Electric Co. of Boston, Mass.

Estimates furnished for Electric Railways, Electric Lighting and House Wiring. Marine Work a Specialty.

35 NEW MONTGOMERY ST., SAN FRANCISCO.

IMPORTANT TO GOLD MINERS!
SILVER-PLATED AMALGAM PLATES for SAVING GOLD
In Quartz, Gravel and Placer Mining.

PRICES GREATLY REDUCED. ONLY REFINED SILVER AND BEST COPPER USED. OVER 3000 ORDERS FILLED. FIFTEEN MEDALS AWARDED. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated. These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Streets, San Francisco.

SAN FRANCISCO GOLD, SILVER AND NICKEL PLATING WORKS,

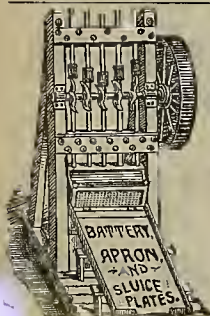
E. G. DENNISTON, Proprietor.

653 & 655 MISSION ST., SAN FRANCISCO, CAL.

Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper.
SEND FOR CIRCULAR.



RECEIVED EVERY MEDAL
Awarded on the Pacific Coast
for Silver-Plated Amalgam
Plates and Best Gold, Silver
and Nickel Plating.



MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXIV. — Number 20.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MAY 14, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Ingersoll-Sargeant Cold-Air Compressor.

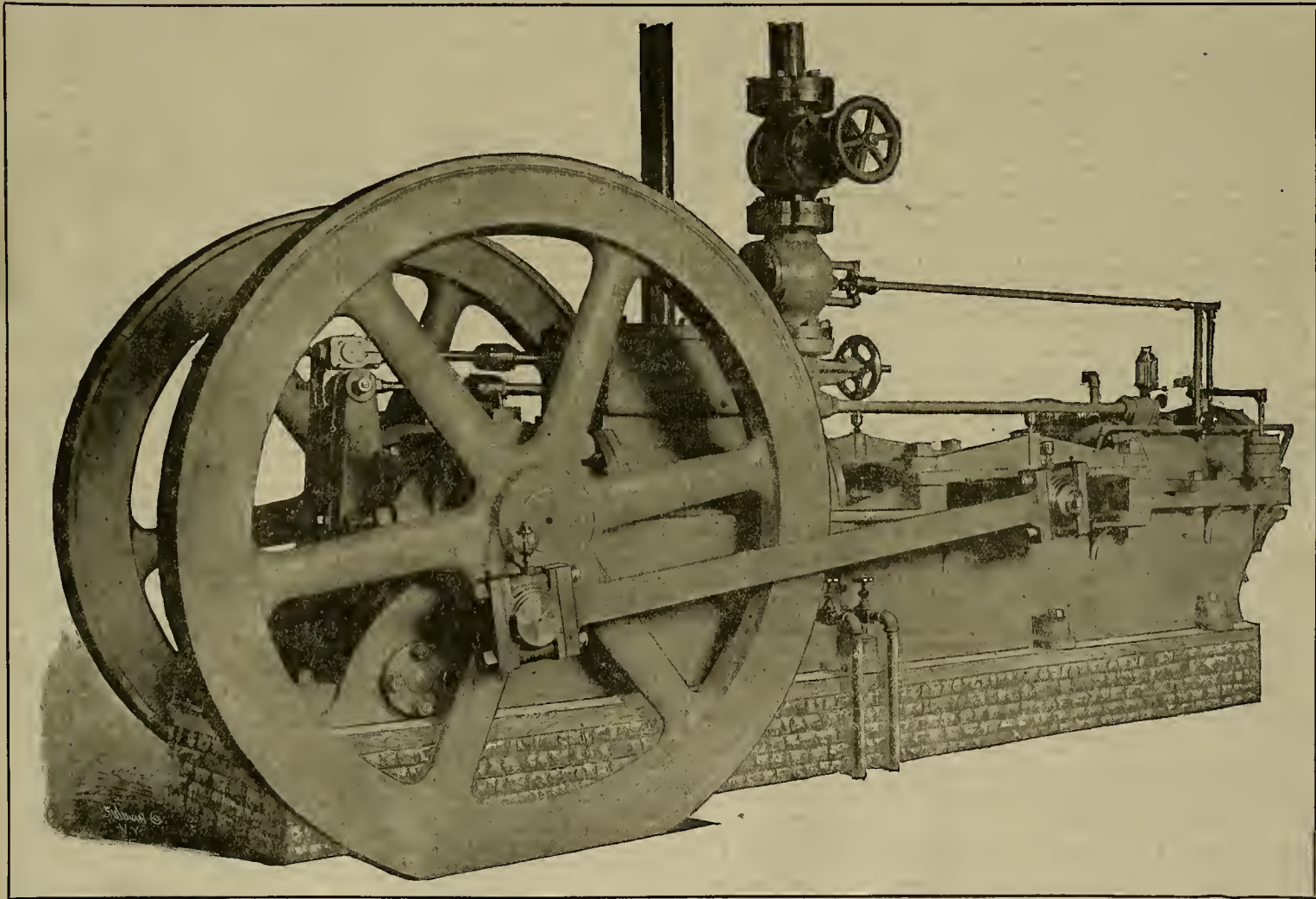
The cut on this page shows the Ingersoll-Sargeant piston inlet cold-air compressor of class A, steam actuated. This is the only air compressor with cold-water jackets through the cylinder heads—no water enters the cylinder. The free air, before admission to the cylinder, is under thorough control, and may be taken from that point

cylinder is shown in one of the cuts on page 359. The inlet valve is also shown. In the cut, A is the cold water inlet. B, cold water discharge; C, jacket drain; D, oil hole for automatic oil cup; E, air inlet; F, air delivery; G, inlet valves; H, delivery valves; I, cold water jacket.

The air inlet valves are large metallic rings, which are not operated by springs, but which open and close by the natural momentum given to the valve by the move-

your pen-knife on the palm of your hand and thrust your hand forward and backward. You will thus have a simple illustration of the movement of this valve. You will see that at the instant that you reverse the direction of movement of your hand, the pen-knife continues on until the friction which holds it to your hand overcomes the momentum, which tends to continue its movement in that direction in which it was started.

the compressed air near the end of the stroke when the air is hottest. The simple jacket applied to air cylinders of other compressors has little cooling effect upon the air, because when the air in the cylinder reaches a point when the discharge valves open—that is, when it reaches the pressure represented by the gauge on the air receiver—there is but a small annular ring of exposed jacketed cooling surface; while with this cylinder this cooling surface is



INGERSOLL-SARGEANT PISTON INLET COLD-AIR COMPRESSOR.

which is the most favorable in its dryness, reduced temperature and freedom from dust. The admission of free air being through a single tube creates a constant and uniform draft of air in one direction only, thus filling the cylinder at each stroke with air at atmospheric pressure. In other air compressors, the air must be started from a state of rest. Indicator cards taken on the cylinders of this compressor prove conclusively that not only is the cylinder filled with air at atmospheric pressure, but in some cases the line runs above the atmospheric line to the same extent that it runs below it in other air compressors.

The concentrated piston inlet cold-air

ment of the piston. A study of the sectional cut will show that when the piston is moving in one direction, the ring valve on that face of the piston which is toward the direction of movement is closed, while that on the other face is open. This is exactly as it should be in order to discharge the compressed air from one end of the cylinder while taking in the free air of the other. The position of each valve is almost instantaneously reversed at the point when the stroke is reversed. This change in position takes place without springs or other influence than the natural momentum of a piece of metal which is carried in one direction and is instantly reversed. Place

The large ring air inlet valves which serve to admit the air are practically indestructible. Two of these valves were operated night and day for one year at an extraordinarily high speed, and on being examined, did not show evidence of wear.

The large ring air inlet valves admit of a large area of inlet with but a small throw of valve, thus quickly opening a large supply port and enabling a compressor to run at high speed without a reduction of efficiency, and with safety to the quick-moving parts.

There being no inlet valves in the heads of the air cylinder, the space otherwise occupied by these valves is filled with cold water, thus presenting a cooling surface to

largely increased by a cold head. Indicator cards taken on air cylinders of this compressor show a pressure line approaching nearer the isothermal than in any other except, perhaps, those that inject water into the cylinder.

Clearance spaces are reduced to a minimum. That this is true is evident from an examination of the sectional cut of this cylinder. There are no counter sunk spaces in the cylinder heads for inlet valves, but there is a single annular space to take the place of the large ring inlet valve. The valve covers this space at the end of each stroke, so that there is no dead space.

(Continued on page 359.)

Against Boycotts.

The Manufacturers' Side of the Case.

The Board of Directors of the Manufacturers and Employers' Association of this city has issued the following manifesto:

The Board of Manufacturers and Employers of California believe that the time has come when a universal and systematic effort should be made to put an end to boycotts and the pernicious interference of trades unions with the internal affairs of trade. Unless this be done, the already suffering industries of the city will soon become so badly handicapped as to be practically out of the race in the competition of the world. Every line of production has suffered from this cause. Tons of iron work of all sorts, formerly made here, are now shipped in from the East. Large quantities of printing are now shipped in from the East. California produces some of the best leather in the world, and yet the amount of leather products imported from the East is steadily increasing. The manufacturers of furniture are facing a ruinous competition. Much of the hardwood finishings for our buildings is prepared in the East and shipped here ready to be put in place. The lumber output is curtailed. Coasting vessels are laid up. Although the second wool-growing State in the Union, our output of woolen goods is ridiculously small and growing less. Eight hundred white cigar makers once found employment in San Francisco; now less than 200 work at their trade. Eastern barrels threaten to close our cooper shops. Eastern bottled beer competes with a superior San Francisco product.

FACTORIES GOING EAST.

Several factories have gone East, and more are expected to follow. Possessing an unrivaled harbor, a splendid location, a rich and vast subsidiary country and plenty of capital, the city ought to grow faster than the cities of the East. Instead, at the present rate, the next census will show a population of 200,000 in place of the 500,000 it ought to show. The loss of the city is the loss of the State. Stagnation means the consumption of less lumber, less grain, less fruit, less of everything the country produces. It means that the farmer must pay freight to distant markets. The firms in the Manufacturers' Association employ 40,000 people and pay \$100,000 per day in wages. What if these plants go East?

Wages are higher here than anywhere else in the world. According to the official report of the Bureau of Labor Statistics, they are more than 10 per cent higher than in Illinois; more than 20 per cent higher than in New York; more than twice the amount of wages in England, and more than three times the wages paid in Germany, France and Italy. While wages are higher, the hours of labor are shorter than in any other country except Australia, the cost of living is less, and the climate permits work all the year round. This is not due to the unions. It is natural to California. It would prevail if no unions existed.

NO DESIRE TO REDUCE WAGES.

The manufacturers do not complain of the wages. There is no desire to reduce them below the normal rate, which must always remain the highest. If permitted to do business in peace, the manufacturers could pay these wages and prosper. It is the element of uncertainty that kills. The labor leaders seek to control the men, and the manufacturer cannot manage his business to the best advantage. It is because the life of a business has heretofore been at the mercy of the boycott that manufacturers have been afraid to launch into new undertakings, improve their plants or push for new avenues of trade.

The levying and agitation of a boycott is always harmful—not perhaps to the particular industry sought to be injured, but to the community at large. It fomenta uneasiness. It alarms capital intended for investment. It creates that uncertainty which is the death of trade. It gives a bad impression of San Francisco to intending settlers. Boycott circulars always lie. It is not too much to say that not a single truthful boycott circular has been issued since boycotting began. Their misstatements slander the city and slander the men doing business here. They are pernicious, destructive and wholly bad.

A CRYING EVIL.

The boycott is a crying evil of our times. It is the persuasion of brute force. It does not belong to modern civilization. It is never honest. Walking delegates have been bribed to boycott competitors, and walking delegates have exacted bribes for immunity from boycotts. It is never just. When Cahn, Nickelsburg & Co. introduced new machinery into their factory, a committee of expert manufacturers reported that

the new rate on the new machines has actually increased the wages of the operator, yet a boycott was levied. The *Abend Post* is boycotted after the Typographical Union declared the boycott untenable and asked to have it raised. Wellington coal is boycotted long after the Wellington strike is declared off. Breweries are boycotted, notwithstanding that the beer drivers in a body protested against the wrong and declared that they would no longer permit the Federated Trades to dictate what they should eat, drink, wear and read. Dry goods houses are boycotted, although all their clerks declare against it. A boycott is in all respects a highwayman. He is an industrial wrecker. His single and simple proposition is, "stand and deliver."

These evils do not spring from the better judgment of the workmen themselves. They are the result of the system of paid walking delegates. It is a matter of common experience that a union supporting a walking delegate can never be at peace. The moment agitation ceases the men grow careless, do not attend meetings, and neglect to pay dues. The paid walking delegate finds his source of revenue growing precarious and his reputation as a leader growing pale. He fomenta discontent, creates a labor war, fills up his treasury, and is at once the observed of union men and the hero of the hour.

EVERYTHING TO LOSE.

The paid walking delegate has everything to gain from a labor war; the workingman has everything to lose. If a strike succeeds, the workingman is still a loser, but the paid walking delegate reigns supreme. Agitation is the life of unionism. None know this better than labor leaders. They have a slogan: "Agitate, educate, organize." But "agitate" comes first, and is the most important. This activity is good for the paid walking delegate, but it is ruinous to business and calamitous to industrious workingmen. When a workingman stops to consider the amount he has paid in dues to his own union, the amount in assessments to assist other unions in trouble, the amount he has lost in wages by going out on strikes, he sees at once that the union has cost him much, and gained him nothing. The average workingman does not desire to belong to a union. He does not attend the meetings. He only belongs because compelled. A few men run the meetings, run the unions and bring on all the labor wars. The few gain by it; the many suffer.

This condition of things should no longer be tolerated. The boycott should be stopped. The citizens of the State hold this evil in the hollow of their hands. Let them declare against the boycott and it is doomed. Watch your employees and discharge boycotters. Patronize boycotted firms. When boycotting becomes dangerous, and boycotts help more than they harm, boycotting will cease.

How Society is Indebted to Invention.

In the "Relation of Invention to the Conditions of Life," in the *Cosmopolitan Magazine*, Mr. G. H. Knight says:

With each step in industrial progress not only is the greater the number who can be warmed, fed and clothed, and the better are their life conditions, but in default of such progress a vast majority would not have lived at all. It is to industry, guided by scientific methods, and to science that concerns itself with practical applications of its discoveries, that we are indebted for such magical arts as that which makes light itself depict for posterity the very features and expressions of the life it once illuminated; for the kindred art whereby scenes in the most remote regions are made to pass in realistic panorama before the pleasantly cheated vision; for the instrument which, having analyzed the sunbeam and revealed the chemical constituents of distant constellations, becomes, in the hands of the metallurgist, the means of determining the precise instant at which to arrest the process of "conversion" in the Bessemer steel manufacture. It is to invention that society is indebted, not alone for the refinements, but for every necessary of modern life; for food, clothing, and shelter; for the arts of spoken, written and printed speech; for the means of flashing the very voice to a listener in a distant city, or catching the fugitive, tremulous tones and storing them for the delectation of generations yet unborn; for music, poetry, and the plastic arts; for locomotion by land, by sea, and even through the circumambient air; for the gift of soothing with healing wings the bed of anguish; for the ability from this tiny speck of earthly life to sound the abysses of time, thought and space.

It is estimated that about 30,000 horses were ousted from street-car service last year by electricity.

How They Measure Electricity.

Consumers of electric light have frequently wondered how the ingenuity of man has succeeded in measuring the amount of electricity used in stores and private dwellings. With all the investigations and discoveries made, electricity is still something enveloped in mystery, and its use is still to a great extent empiric. Open one of the meters and you will find that it consists of two compartments; in the upper you will find a thin piece of German silver running in a zig-zag line across the compartment; in the lower compartment, separated from the upper by a bar, the latter being a part of the cast-iron construction of the meter, there is a spool of copper wire and a bottle; in the latter there are two pieces of zinc separated from each other by a piece of rubber. These three things constitute the meter. Some meters contain two of each kind, and are called double meters, being capable of doing double the work done by a single meter.

The principle underlying the measuring of electricity is that of electroplating, says the *Manufacturers Gazette*. The latter is done by means of an electric battery, a piece of copper being placed in the battery on the positive pole or wire, and the object to be plated being placed on the negative wire. By the action of the electricity the copper is eaten away from the positive wire and fastened to the opposite wire. In the electric light meter two pieces of zinc are used; this zinc must be chemically pure, in order that the measurements may be perfectly correct. These two pieces of zinc are separated by rubber and joined by rubber bolts, so that they may be near each other, and still not permit of passing of the electric current.

One piece represents the positive pole, the other the negative pole. Now the more electricity passes through these pieces of zinc the more zinc will be taken from the positive to the negative pole, so that if enough electricity is used in course of time all the zinc would be on one pole. Here you have the principle of measuring electricity. After the pieces of zinc have been in operation for some time, one will weigh more than the other, and it is just a matter of mathematical calculation how much is charged, the charge being relative to the amount of zinc decomposed.

But if the bottles were all that was used for the measuring of electricity, it would require a bottle the size of a house to measure the electricity used in the average residence or store, and the consumption of zinc would be something enormous. It is for this purpose that the piece of German silver is used, this metal being selected as best fitted for the purpose. This piece of metal is called a shut, because it shuts off most of the electricity and prevents it from going through the bottle. This piece of metal is so accurately adjusted that it takes just 999 parts of electricity to one which passes through the bottle. The electricity from the electric light wire, before it goes to the lamps, passes through the meter; here one-thousandth part passes through the bottle with its pieces of zinc, the rest being shunted off through the German silver. It is on this account that the size of the bottle may be reduced to small dimensions.

The spool of copper wire is fixed between the wire and bottle. When the solution of sulphate of zinc contained in the bottle gets too warm, it permits more electricity to pass through it than the one-thousandth part of the whole. At the same time the increase in temperature would have an opposite effect on the German silver, and less would pass through. This would result in a very heavy registering, the amount of zinc consumed being proportionally large, and would be an injustice to the consumer. In order to avoid this the spool of copper wire is used; when the bottle gets too warm, the copper wire is similarly affected. The copper does not permit the bottle to gobble up all the electricity it would like, and thus acts as a regulator.

It will be seen that the measuring of electricity depends on the most carefully adjusted mechanism. As a matter of fact, the weighing of the zinc negative plate is the more delicate. During the last days of the month, employees of the Edison Company go about among the customers of the company, gathering in all the bottles and replacing them by others. These bottles are all carefully marked and taken to the office of the company. Here the pieces of zinc are separated, and the negative pieces, which are indicated by being opposite to where the head of the rubber bolt is, are carefully washed and then permitted to dry.

After this their record is looked up, and the operator knows just in a milligramme how much a h piece of zinc weighed before it left the works and was put in the meter.

On one of the most nicely adjusted scales the zinc is weighed, and the difference in its weight noted down. This decrease of weight is multiplied by a figure known as the constant, and the result is the bill of the consumer in dollars and cents. Of course, the zinc removed from the positive pole is deposited on the negative, and the amount of electricity used might be ascertained by weighing the negative piece and noting the increase in weight; but this would not be accurate, as some of the zinc in process of being transferred from pole to pole is lost in the solution. Besides that, to determine the amount of electricity used in this way would give way to fraud on the part of a few consumers who understand electricity. There is no likelihood of their scraping the positive pole, for the more they scrape it the higher would their bill be.

It is but natural that only the most nicely adjusted scales can be used in the weighing of these pieces of zinc. In the first place, before the weighing is done, every door and window is closed, although the weighing is done in an inside room. The least bit of air would add several dollars to some consumer's bill. Then the scales are covered with glass, and it is only when the piece of zinc has been placed on the scales and the glass lowered that the weighing is proceeded with.

Differential Staining with Eosin.

At the last meeting of the San Francisco Microscopical Society, a paper was read by R. H. Freund on "The Differential Staining of Cover-glass Preparations by Eosin." He said aniline dyes were of two groups—the basic and the acid. To the first belonged methyl-violet, gentian-violet, methyl-blue, vesuvium, fuchsin, and a number of others. To the second group belonged the derivatives of the fluorescein group—eosin, methyl-eosin, cocein, pyrosin and aurantia. Koch and Weigert have used the selective affinity of the basic colors for staining and differentiating bacteria, and taking Koch's researches as the base, Ehrlich has succeeded in utilizing them in staining and differentiating the cellular elements of the blood. He gave his method the name of the Tinctorial or Color analysis, asserting that certain dyes under all conditions produced invariably the same effect on some cell elements, with the certainty of a chemical experiment; in fact he claimed that the result obtained was a chemical compound formed between the dye and the object brought in contact with it.

A number of years ago, Waldeyer (*Archiv für Mikroskopische Anatomie XI*) observed that on different places on the loose connective tissue are to be found large, round, coarsely granular cells which he called embryonal or plasma cells. He asserted that these cells had a disposition to absorb fat, and that in time they might degenerate into fat cells. Investigating Waldeyer's observations, Ehrlich found that these cells have a disposition to absorb and retain certain aniline colors; and following up his experiments, he found that an analogous reaction takes place with certain granular elements of the blood. That Ehrlich's researches are not better known is due to the fact that until last year his published observations were scattered through the different medical journals; but now he has collected them into a volume, "The Histology and Clinic of the Blood and Relations to Color Analysis."

Mr. Freund's paper gave a very careful resume of the subject, and he explained to his hearers his own method of preparing, staining and mounting blood. His paper was further illustrated by a number of preparations shown under microscopic amplification of 1,200 to 2,000 diameters. Among these were two beautiful slides prepared by Dr. Bein of Berlin.

After the reading of the paper an interesting discussion took place, in which Dr. Wythe, Dr. Sanderson and others took part. It was asked whether any *ante mortem* treatment of the blood would facilitate its study, to which Dr. Wythe replied that a guinea pig could be fed for weeks with sulpho-carbolate of soda in its food, and when killed, the blood could be treated with numerous reactionary elements, which would yield beautiful and permanent stains.

THE VALLECITOS OIL FIELDS.—Recent developments show a decided improvement in the quality and quantity of oil from the San Carlos Oil Company's well No. 1 in the Vallecitos oil fields in San Benito county. Recent tests show an annual put of 3000 gallons per day, 76 per cent of it being a rare quality of lubricating oil, very valuable in the market. Several 800-foot wells will be bored at once by the company. The development is creating great excitement in the country.

Gold and Silver in the United States in 1891.

The following is an abstract of the report of Hon. E. O. Leech, Director of the U. S. Mint, for the calendar year 1891.

The product of gold from the mines of the United States aggregated 1,604,840 fine ounces, of the value of \$33,175,000. This is an increase of \$330,000 over the product of the previous calendar year. The increased product is due largely to improved processes of treatment and to the increased amount of gold extracted from lead and copper ores.

The product of silver from our own mines was 58,330,000 fine ounces, of the commercial value of \$57,630,040, or of the coining value in silver dollars of \$75,416,565. This is an increase of 3,830,000 ounces over the previous year. The increased silver product was due principally to new finds in Colorado and Idaho and to the cheapening of the process of smelting lead and copper ore bearing silver.

The Director of the Mint has made a special effort to distribute for the first time the silver product of the United States as to the sources of production. He estimates that of the total product for the last calendar year 28,497,000 fine ounces was produced from quartz and milling ores, 29,707,000 from lead ores and 6,126,000 from copper ores; total silver output, 58,330,000 fine ounces.

The total product of Government and private refineries in the United States, including foreign material smelted and refined, was: Gold, 2,169,863 fine ounces; silver, 69,336,415 fine ounces.

The total value of the gold deposited at the mints during the year was \$70,915,632, of which \$24,853,180 was foreign coin and bullion. The deposits and purchases of silver aggregated 73,088,626 standard ounces, of the coining value of \$85,048,584.

The amount of silver purchased by the Government during the year was 54,393,912 fine ounces, costing \$53,796,833. The average cost of the silver purchased during the year was \$0.989 per fine ounce. The average cost of the total amount purchased under the act of July 14th, 1890, has been \$1.02 per fine ounce.

The price of silver at the commencement of the calendar year 1891, was \$105 per fine ounce, and the close, December 31st, was \$0.955 per fine ounce. The average price for the calendar year was \$0.99 per fine ounce.

At the date of the passage of the act of July 14th, 1890, the price of silver was \$1.74 per fine ounce; at the date the law went into effect it had advanced to \$1.13. The highest point touched was on August 19th, 1890, \$1.21 per fine ounce. The lowest point touched was on March 28th, 1892, \$0.85½ per fine ounce.

At the lowest price of silver during the year the commercial value of the pure silver contained in the silver dollar was \$0.73¾; at the highest price, \$0.826, and at the average price \$0.764. At the price of silver March 28th, 1892, the commercial value of the pure silver dollar was \$0.66.

The coinage of the mints during the calendar year 1891 was as follows:

Description.	Pieces.	Value.
Gold.....	1,770,620	\$29,222,005 00
Silver Dollars.....	23,562,785	23,562,785 00
Subsidiary silver coins.....	20,451,916	3,956,121 60
Minor coins.....	63,906,700	1,312,441 00
Total.....	118,691,971	\$58,053,302 60

In addition to the coinage gold and silver bars were manufactured as follows: Gold, \$87,865,473; silver, \$6,979,510; total, \$44,844,983.

Gold bars were exchanged for gold coin, for use in the industrial arts, of the value of \$12,495,094.

The imports of gold aggregated \$45,298,928; the exports of gold, \$79,187,499; net loss of gold, \$33,888,571. The imports of silver aggregated \$27,910,193; the exports of silver, \$28,783,393; excess of exports over imports, \$873,200.

The value of the precious metals used in the industrial arts in the United States during the year was: Gold \$19,700,000; silver, \$9,630,000; total \$29,330,000, of which \$10,697,679 gold and \$7,289,073 silver, consisted of new bullion.

WORLD'S PRODUCT OF GOLD AND SILVER.

The product of gold and silver in the world for the calendar years 1889, 1890 and 1891 was as follows:

	Gold.	Fine ounces.	Value.
1889.....	\$123,398,000	123,205,000	
1890.....	119,464,000	132,833,000	
1891.....	124,229,000	140,865,000	
	Silver.	Coining value.	
1889.....	\$115,197,000	\$159,295,000	
1890.....	139,475,000	171,744,000	
1891.....	139,175,000	182,129,000	

The product of gold increased in 1891

over the prior year nearly \$5,000,000, the increase being principally in South Africa. The product of silver increased in 1891 over the prior year about 8,000,000 fine ounces.

Bits of Practical Experience.

Many of our readers have bits of practical experience in locating and overcoming difficulties in the engine-room or about the plant, or in erecting work, which would be of the greatest interest to our readers if clearly described; and they could advance their own interests as well as offer good suggestions to their young brother engineers by writing out a statement of the facts for publication. It is by an exchange of ideas that we become the better posted and more able to deal with the contingencies which occur in practical engineering. Many engineers, while admitting that they have encountered problems which have bothered them for a long time, but which they finally overcome in a simple and practical manner, often say, when asked to write out a statement of the same for publication: "Oh, I am an engineer and not a writer. I can tell these things to you all right, but I can't write them out so they would look well in print." To such we wish to say, if you have anything of general interest or practical importance, write and tell it to us in your own way, and we will try and make it read all right when it appears in the paper. Other engineers, after telling of how they located and overcome difficulties, will say, when asked to write it out for publication, "Oh, what's the use, all the engineers know it." All the engineers do not know it, and there are plenty of young men struggling along, trying to become proficient in their business, who would be only too well pleased to read of these little things that "all engineers know." So, boys, send in your little communications, and tell us how you did this, that or the other thing, as all such statements are pointers, and serve to help along the young engineer. A case or two which will illustrate may be given:

An engineer, while cleaning out his furnace, noticed an accumulation of soot on the boiler wall high on the side. It had a plumelike appearance, the stem of the plume being upward. This excited his curiosity, because the tendency of draught was such that the formation should have pointed in the opposite direction. This indicated to his observing mind that something was wrong in that locality, but nothing could be seen which might have caused it. Investigation proved that there was a crack in the sheet, and a small jet of water blowing through had produced a current against that of the air and gases caused by the draught, and the moisture striking the wall had carried soot with it and deposited it, forming the beautiful black plume he had noticed. Here a little observation and the ability to study from effect to cause had called his attention to what might possibly have resulted in a rupture of the boiler, if not attended to in time.

In another case an iron smokestack blew down during the night, and as the top of the boiler-house was 16 feet from the ground, and not strong enough to support a derrick, it became a question how to get that stack back in place, and in the shortest space of time possible. As the engine-house was at some distance from any town or base of supplies, the problem was of some importance.

To engineers of extensive experience there would be no particular difficulty in either of the above cases, but the young engineer, whose experience is limited, would derive benefit from a description of the indications, the investigation and the method employed in making the repairs. Practical, everyday engineering includes many little points which call for the exercise of ingenuity more than the application of experience.—Stationary Engineer.

A BIG MINING SUIT.—The case of the Consolidated Wyoming Gold Mining Company vs. the Champion Mining Company, involving the ownership of the Ural and Wyoming quartz mines, has been transferred from the Superior Court of Nevada to the United States Circuit Court. Two hundred thousand dollars damages are asked for the sinking of a shaft and the carrying away of 20,000 tons of ore; also an order enjoining the Champion Company from further trespassing.

PROFESSOR ELIHU THOMPSON, in a recent article, states his belief that 130,000 horse power at 500,000 volts can be transmitted 240 miles through three wires about as large as a good-sized knitting needle, and, moreover, that this can be sent underground through a small pipe, using only cotton and cheap oil as an insulator.

Prospecting in Fresno.

This is not essentially a mining county. It is an agricultural and fruit-growing region; but among the hills and in the gulches of the Sierra Nevada there are hundreds of small claims, no one of which represents a large fortune, but when taken in the aggregate they all amount to a considerable.

There are hundreds of old miners in this county who still feel sure that there yet remain to be discovered mines as rich as any ever discovered in the past. Somehow, the idea seems to have a strong resting place with men who have followed this pursuit, that the best and the greatest mine of all yet remains to be discovered; and many a man spends a part of each summer searching for the "mother lode," as it is called.

IT MAY BE DISCOVERED.

There is no reason why such a ledge may not be discovered. Geologists are of the opinion that such a ledge exists somewhere in the Sierra Nevada mountains, and that all trace of its appearance on the surface was ground away by the action of glaciers during the epochs of ice.

If this was so, the ledge exists somewhere beneath the debris and soil of the mountains, and sometime, it may be, an old miner of '49 will discover the object of his dreams, and enough gold will be found in that one mine to make the world rich forever.

THIS SEASON.

As soon as the snows melt in the lower mountains this spring, there are many persons ready to go into the hills on prospecting tours, searching for new mines and working old ones. It is the regular summer work of many people. It is a sort of vacation, sometimes profitable and always pleasing. There is always a prospect of making some great discovery; and the labor is of a pleasant sort and reminds the laborer of the time when he had nothing to do when he wanted money but to go and dig for it in the ground and get all he needed.—Fresno Examiner.

CRYSTAL SALT.—On Monday the Directors of the Crystal Salt Company moved the principal place of business to Colusa. Wells are being sunk, vats built and other work done to develop the business. The works are three miles north of Siles. Water will be pumped into a lake covering some 10 to 15 acres, and drawn off into vats after it has become almost strong enough to begin to form salt. In addition to the employment of solar heat in making the salt, the natural gas that is found in great abundance will be used. The solar heat will be put in operation first. The supply of gas is inexhaustible, as well as the supply of water from 15 to 40 per cent salt, the sea being only three per cent. The salt, when made, is some three per cent purer than any other salt known to commerce. The bittern, or the water left after it has quit making salt, has from 20 to 30 grains of iodine to the gallon. This is stronger in iodine than any known water. The iodine is freed from the other substances by distillation, and the natural gas will furnish the fuel for that. The outlook for the company is splendid.—Colusa Sun.

THE NEW CALEDONIAN NICKEL MINES.

—The Societe du Nickel, which operates the extensive nickel mines of New Caledonia, has taken a novel step in introducing Japanese labourers for the purpose of working its mines. The company has hitherto been seriously hampered in its operations through the difficulty in securing efficient labour, and finally, having obtained authorization to employ Japanese, a colony of 600 has already been brought to the island. Notwithstanding the trouble experienced from the before-mentioned cause, the report of the Societe du Nickel for the past fiscal year shows a very satisfactory return from its mines; and it is anticipated that the present year will show a considerable increase, new and favourable arrangements for the shipment of the matte to Europe having been made.

ELECTRICAL LOCOMOTIVES.—The Boston correspondent of the *Electrical World* says that the electric locomotive which is being built in factory L. at the Thomson-Houston Electric Company's works, at Lynn, is rapidly approaching completion. It will be a monster in its way, of some 500 h. p., and destined to take the place of a steam engine on a railroad for pulling either passenger or baggage cars. The electric locomotive is sure to grow, the tendency being very much in this direction, as a prominent official of the Northern Pacific Railroad Company said not long ago that this road would be run by electricity inside of three years. If so, it is probable that the locomotives will be furnished by the Thomson-Houston Company.

Fibre-Graphite.

Fibre-graphite is a new anti-friction material that has very recently come into general use. It was invented some two years ago and is very rapidly acquiring prominence as an antifriction material for journal bearings, because of its very valuable property of doing away with all oil as a friction-reducing agent, thus eliminating from all machinery plants a very considerable item of expense. Fibre-graphite is composed of two materials, hard wood fibre and graphite. It is manufactured by the following process: Hard wood fibre is reduced to a pulp, graphite is then added in a powdered state, and this material is taken to the mold, which consists of an iron box or tub, with several very small holes in the bottom. The wood fibre and graphite are placed in this mold, water is added and hydraulic pressure is applied. The pressure causes the water to escape by the holes in the bottom of the mold, and in its escape it causes the wood fibre to take a perpendicular position, and as the wood fibre prevents the graphite from escaping, the latter is compressed between the fibres which are themselves coated with graphite, and the result is a dense mass of fibre-graphite. It can be pressed to any density, making it capable of standing any pressure brought to bear upon it. When taken from the mold the material is in a finished condition and has a very smooth surface of a satin-like appearance. After being removed from the mold it is dried in the atmosphere for a short time, after which it is thoroughly saturated with purified linseed oil and baked in an oven. This last operation leaves the material ready for use. The wood fibre in taking a perpendicular position, present the ends of the fibres to the shaft, thus reducing the wear on the journal. In the form of a journal-bearing, fibre-graphite is a solid lubricant, graphite being one of the best lubricants known. The first few turns of a shaft in a fibre-graphite journal, fills the pores of the steel and also gives the shaft a very thin coating of fibre-graphite. This coating, together with the fibre-graphite journal box, make a perfect bearing of antifriction material. This material has passed its experimental state and is now being rapidly manufactured, principally into journal bearings. The inventor, Mr. Holmes, has been awarded a gold medal by the Franklin Institute of Philadelphia. Its uses are manifold, its great advantage being the abolishment of oil. For electrical uses, exclusive of bearings for dynamos and motors, it has met with very great success as a dynamo brush. It has the same conductivity of carbon, never cuts the commutator, and, being a lubricant, wears itself to a perfect bearing on the commutator. For textile purposes it is also beginning to be very much used, textile work having in its winding and spinning machinery, hundreds of small bearings to which it is almost impossible to attend, and for which, by substituting fibre-graphite, no attention whatever is needed.—Electricity.

THE WORLD'S SUBMARINE CABLES.—A statistician has computed that there are at present in the world, under State management, 13,179 miles of submarine cables, with 19,426 miles of wire; and in the possession of private companies, 112,937 miles of cable, with 113,885 miles of wire, being a total, therefore, of 126,116 miles of cable with 133,311 miles of wire. These cables are all in operation, besides which there are several long and short lines in course of construction. Of the lines under State management, Great Britain is credited with 4010 miles, with 7685 miles of wire; France with 3969 miles, with 4486 miles of wire; Germany with 1580 miles, with 2877 miles of wire; Italy with 1072 miles, with 1092 miles of wire, and other countries with 2592 miles, with 3780 miles of wire. Concessions are not now granted in Germany to private companies, which, however, flourish in Great Britain, France, the United States, Denmark, and the Argentine Republic. The miles given are, in every case, nautical miles of 6,086.7 feet.

THEY PAID THE DIVIDEND.—While overhauling some old papers the other day, A. W. Havens, Secretary of the Con. California & Virginia Mining Co., found a small slip of paper, which is of great interest. It was a memorandum of the amount of money on hand in the treasury of the old Con. Virginia Mining Co. on June 5, 1876. The Directors had requested Mr. Haven to furnish them with these figures on that day, as they wished to see whether there was enough coin on hand to declare a dividend. The showing was as follows: Cash in Nevada Bank, \$2,197,769.07; unsold bullion, \$2,007,075.48; total on hand, \$4,204,844.55. It is needless to say that upon this showing the Directors declared a dividend.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

GOVER.—Amador Ledger, May 7: We are in receipt of a communication from the managers of the Gover, saying that the article in our last issue concerning an alleged cave in the mine is incorrect; that there was merely a settling of ground in the old works, which in no way interferes with the running of the mill; that no ground has been lost and, furthermore, that the future of the property is very promising. All of which we are pleased to hear.

MISCELLANEOUS.—The Grass Valley hydraulic claim is cleaning up. Twelve men are employed, and two guards watch the property day and night. It is expected that the run has been very satisfactory, and the cleanup is expected to reach at least \$20,000. L. Ludekens is washing some pay dirt on his claim, adjoining the Grass Valley hydraulic mine. It is turning out something like \$10 or \$12 per day. A. W. Kimball has shipped some of the ore from his rich claim in Pioneer district to San Francisco for treatment. It is claimed that the ore will assay on an average \$100 per ton, and that it cannot be worked to advantage in this county.

SUTTER CREEK.—Everything at the Hector mine has settled down to its former quiet attitude, and taking out water has been resumed. They have already got down to where they left off, and if they can continue at the rate they have been going, no doubt they will reach the 200-foot level inside of the next two weeks, when the taking of ore will be inaugurated as soon as possible, in order to pay expenses as developments progress. All revenue was stopped when the dynamite explosion happened, and whereas the mine was then in fact on a paying basis, the company will now have to go into their pockets until they get to ore in the 200-foot level. Mr. Finch, one of the owners, has been up from the city for several days, helping Mr. Valentine look after matters, and they have concluded to explore the mine to a considerable extent. The pump is finished in the South Eureka, and crosscutting has commenced in earnest. They expect to strike a ledge in a short distance, and they feel confident that it will be of a paying character. The Lincoln still continues to run on a slim scale. At the Belmont things are looking encouraging for a permanent mine. Martin Jones, the president of the company, is up and is perfectly satisfied with the way Mr. Tibbitts, the superintendent, is managing the mine, and contemplates putting in improved hoisting power in the near future. They have about a dozen men on the pay roll with a prospect of increasing the number before long.

PLYMOUTH.—Amador Record, May 5: A Plymouth correspondent informs us that there is considerable rejoicing at that place over the fact that operations will be resumed at the Plymouth Consolidated mine again right away. Report has it that there will be more men put to work there than has been employed for some time past. It is to be hoped that this good news will be verified.

CLINTON CONSOLIDATED.—Our Weiland correspondent writes that the Clinton Consolidated Co. started its air compressor, which was recently put in by David Fisher, on the 18th ult., and that it works satisfactorily. The compressor is an Ingersoll, and with 80 inches of water runs three Ingersoll-Sergeant drills of 34 inch cylinders. The mill is crushing 100 tons of ore daily.

Butte.

ANOTHER MILL.—Palermo Progress, May 4: Hay & Clark will soon put in extensive mining machinery at their Bangor mine. They have purchased a 20-stamp mill from a company which formerly worked the Mineral Slide near Paradise. The mill and its equipments are rather bulky, and it will be several weeks before much headway is made toward moving them. They are at present near the base of a steep incline, and a new road will have to be built before they can be moved to the top of this. A new engine has also been purchased for the mine, which will shortly arrive from the city and which will be used for pumping as well as for running the mill and other machinery. Messrs. Hay & Clark will shortly take up their permanent residence at Bangor in order to be near the seat of their operations and superintend things for themselves. Milt Sheets has been permanently engaged as their engineer.

DAIRING.—Oroville Register, May 5: On the west branch of the Feather river, just below Magalia, is the Wright Durgan property, now exciting considerable attention. For choice of location and rich promises it is unequalled in that vicinity. Superintendent Lewis, formerly of the Butte Queen mine, has organized the Durgan property, with a view to permanent and substantial returns. From the first it has given every indication of worth. Their fine dumps and flumes are now completed, and some 20 men are engaged in drifting. The gravel is inviting and prospects fine. Commencing at the old Daniels place, we find in this same section the Mossback mine, owned by H. R. Benning. Associated with him are Messrs. Knox, Hendricks and Lambert. They are now in pay dirt, having completed 140 feet of bedrock tunnel. Meantime they have bonded and will doubtless purchase a large extent of this channel, some say a stretch of two miles, with a view to more extensive operations. On Little Butte Creek, below Nimshe, there is a very decided flurry of excitement. The mines in that section are known to be very rich and have heretofore furnished a living for any number of easy going miners who are quite satisfied with "sufficient unto the day."

No man has ever doubted the large wealth of this section, and one of the best evidences is the immense banks of tailings, representing past labor, to be seen thrown out all the way from Centerville to Nimshe. All these have a gravity drainage, in itself a valuable feature. Then the gold is generally coarse and of an extremely fine quality. Messrs. Proud and Hemsley have opened the old Kirkwood at this point, or rather are arranging preliminaries to that end. Some twelve miles southeast of old Lovelocks, at the junction of the Little and Big Kimshe, lies the Lindsey Bar mine. Mr. Spencer, the manager, and Anderson, the foreman, are both men of fine experience in their line. They are associated with three or four other gentlemen, with a view of cutting through the lower rim of the channel under the creek, and thus draining the bedrock. To this end they have over 100 feet of 7x8 tunneling complete, with a double compartment flume which will entirely extend through the tunnel to carry off the debris. This piece of work will be completed by June 1st, preparatory to a fine business during the summer. Just above this point, on the Little Kimshe, is Ramsey's Bar. Here a snug little company of seven, mutually interested, are driving ahead. "Prospects good or wouldn't stay, you bet," said one bright-eyed fellow. North and east of these are the Snow mines. These have always paid well, and, I am told, are yielding good dividends now.

El Dorado.

CYANIDE PROCESS.—El Dorado Republican, May 5: The owners of the Pyramid mine at Green Valley have under consideration the cyanide process on their ore. The Pyramid has one of the largest bodies of quartz in the county, and tests of the ore made by the proprietors lead them to believe that if it is properly handled, the mine will become exceedingly valuable. There has, so far, been much difficulty in amalgamating and saving the gold.

SLATA.—During the week a number of parties from a distance have been inspecting the slate veins that have been opened by the "Big Tunnel," near Placerville, and negotiating for the purchase of the property. They are satisfied with the appearance of the slate, and old quarymen pronounce it the finest they have ever seen.

Kern.

OLD MINES REOPENED.—Bakersfield Californian, May 5: W. J. Graham, of Havilah, has leased the Russian Bear and other mines at Glen Olive, belonging to Palmer & Co., of San Francisco, with an option of purchase. He now has five men at work, with fair prospects, and contemplates soon moving his Huntington mill from Havilah to the new camp. If the mill proves as good a gold saver as it was in Havilah, there is no question but that Mr. Graham's enterprise will result in making a lively and prosperous camp at Glen Olive, or "Topside," as it was first named. The vines there are massive, easily worked, and require very little timbering, and while the quartz is chiefly low grade, there is a great deal of rock rich in gold. The trouble with the first company which worked mines there, and in fact opened the district and started the camp, seemed to be that the gold could not be saved. The quartz prospected handsomely in gold, but was heavily sulphuretted, and somehow, especially in the early runs, gave no satisfactory returns whatever, greatly to the disappointment and loss of the owners. Inasmuch as the Huntington mill, in Havilah, has beaten stamp mill returns with every lot of quartz crushed, the hope is permissible that it will go to a. Glen Olive, in which event handsome results are sure.

Modoc.

MINING DISCOVERY.—Alturas Herald, May 4: That the range of mountains east and north of Alturas contains gold and silver bearing ore can no longer be disputed. For several months past, prospecting has been going on steadily from Willow ranch, in Goose Lake valley, to Lake City over in Surprise valley, and the result has been that an immense body of ore has been discovered which is likely to prove a veritable bonanza for the discoverers and Modoc county in general. Over in Surprise valley the ledge crops out on the mountain side over a hundred feet in width. In fact, the entire mountain is one mass of ore. The rock so far tested has proved that it contains gold, silver and some kind of metal which resembles nickel. The ranchers in that neighborhood are the lucky owners of this valuable find. Mr. W. J. Dyson, an old time assayer, is the gentleman who made the discovery, and Ralph Nesham, an old California miner, has since been working on different parts of the vein running tunnels and sinking shafts. Mr. Nesham built a furnace, and is at present roasting the ore endeavoring to find out where the richest rock in the vein is located. Samples of this ore have been sent out to various assayers on the outside, and the returns have always been very encouraging. We believe that in the near future Modoc will produce as much gold and silver as the neighboring counties surrounding her.

Nevada.

NEGOTIATIONS FOR A MINE.—Grass Valley Telegraph, May 5: We understand that there is a proposition being discussed between the Maryland Mining Company and the Idaho Company relating to the purchase by the Maryland of the Idaho ground and all the machinery of the latter company. The Maryland's ground adjoins the Idaho property on the east, and the Maryland can be worked through the Idaho's openings. The sum of money involved in this proposition is a good big amount. There is no certainty at present that the trade will be made.

THE DERBEC DRIFT MINE.—Transcript, May 5: At the Derbec mine 85 men are employed this month, being 25 less than were at work in April, when an extra force was required in washing over a large quantity of tailings, which

yield good returns. New ground is being opened as fast as the drifts can be run, and the property is in a fine condition all through. The Derbec is one of the best drift mines in the State, and there are many more places in Nevada county where equally good ones could be opened if capitalists only had the nerve and good judgment to prospect for them.

THE NEW PUMP AT PEABODY.—Grass Valley Union, May 7: The new 12-inch pump, which was manufactured by C. M. Taylor, and is a splendid piece of machinery, is placed in the Peabody mine, and is operating successfully. The pumps previously in use were not capable of handling all the water to advantage, and, for that reason, underground work has been greatly hindered of late.

San Bernardino.

THE MINES AROUND BANNING.—Herald, May 3: From mining prospectors who have been coming in from the desert for supplies during the past few days, we learn that there is considerable activity in the desert mining camps. W. H. Alesworth, who, with Mr. Rae of Los Angeles, has received an option on the Carlisle mine, near the old Virginia Dale mine, reports that good progress is being made in his mine. The ore now assays \$20 to \$100 per ton at 40 feet, but prospects are growing better. A mill will probably be put up and a camp opened on this property this summer. Johnny Noble, another prospector of San Jacinto, returned Friday from a trip to Rattlesnake canyon, about 25 miles northwest of Salton, and brought back some excellent specimens, one of which weighed in the neighborhood of \$30. The mines there are owned by Messrs. Stuttenfeld, Brown and others, of San Bernardino, and a mill will probably be put up there in a few months. Prospectors there find plenty of water and good feed for stock. John Wilson came in from the Twenty-nine Palm country last week, and reported that the company interested in the mines there are putting up a Bryar mill and concentrator on their property, and expect to have it in running order about the middle of June, when a large force of men will be put to work. Mines are showing up in good shape in the Twenty-nine Palm country, and the district is being thoroughly prospected. We learn from parties from San Jacinto that a mill will probably be erected at Tingman's mine, on San Jacinto mountain. Altogether, mining districts tributary to Banning have a bright prospect. Messrs. Atkin and McGraff, the men who discovered the Eagle Mountain mine, were in town last Friday. They state that they had run out of water at the mine. While excavating for a reservoir they struck a pocket of free gold which yielded \$700. The Eagle Mountain was sold for \$20,000 some time ago.

AT THE TIN MINES.—Los Angeles Express, May 5: The tin mines are to be more rapidly developed by the addition of new machinery just received. Compressed air will soon be used to drive the underground works, instead of pick and shovel. Gervaise Purcell, of Los Angeles, became general superintendent on Monday, and it is expected that he will be able to push matters more rapidly. Captain Harris remains in charge of the men, with Mr. Stevens as purser.

Shasta.

IRON MOUNTAIN.—Shasta Co. Democrat, May 4: Negotiations are pending for a sale of gold, silver and iron properties north and east of the famous Iron Mountain, which include the Hornet, Little Nellie, Mose Drew, Adaline, Ben Harrison, E. E., Little Nellie No. 2, Miers' Pride, Pomona, and Tippecanoe claims, all owned by B. N. Bughey of Sacramento. B. N. Bughey, owner of the Little Nellie mine, has just sent up to the superintendent, J. M. Gleaves, a new first-class assaying outfit. J. M. proposes to classify the ores at the mine, mill certain grades and ship the best to Paul's works for treatment by the MacA. F. cyanide process. Many Shasta county farmers would do well to follow his example. Dan Haskell, formerly of this city, has purchased the Little Maud mining claim from B. N. Bughey. This claim, adjoining the Little Nellie, has been claimed and worked by Dan for several years, but, being located on a railroad section, he concluded to quiet title by purchase rather than by litigation. J. M. Gleaves made the survey last week.

Siskiyou.

TO TUNNEL.—Yreka Journal, May 4: A company of merchants and business men in town have subscribed means for tunneling Humburg mountain, directly west of town, and men are now at work driving the same, under the supervision of T. D. Austin, an old and experienced miner. No doubt good quartz ledges may be discovered, and probably a valuable supply of water. The Humburg range contains many rich ledges at various points, and also springs and small streams, so that a tunnel through the mountain ought to develop valuable finds of both gold and water. The tunnel has been started high up on the hillside, over 300 feet above the level of Yreka.

CINNABAR.—We learn that an eight-foot ledge of very rich cinnabar has just been discovered on the west fork of Beaver creek, not far from the old ledges of the Siskiyou Consolidated Quicksilver Mining Co. on Siskiyou mountain. This company has been expending considerable money in developing the cinnabar lodes of that section, from late assessments levied, and is well fixed with furnaces and the requisite machinery for producing quicksilver from the cinnabar rock taken out, when found in quantity and richness.

BALLARAT.—The Ballarat Mining Co., now sinking a shaft at the old worked-out Chinese hydraulic claim on Spring gulch, just north of Yreka, struck rim rock last Monday at a depth of over 90 feet below the surface, which necessitates drifting toward center of gulch to reach the bottom of same, where rich pay is anticipated. The heavy body of water to contend with makes the work slow and tedious, neces-

sitating constant pumping by steam power and the employment of day and night shifts. The enterprising members of the company are determined to stick to the work until the bedrock bottom in the channel of the gulch is reached, feeling great confidence in meeting with a handsome reward for their persevering efforts. Another monster giant for mining purposes was received here yesterday for the Pinery diggings in Scott Valley, which are now being worked by a San Francisco company, with Mr. Demming as superintendent. This is the second giant received this spring for this mine, which shows that the ground is to be mined on an extensive scale. Geo. Graves showed us a fine specimen of silver ore yesterday, from a pound and a half of which he obtained an ounce of silver. The ledge is fully 25 feet wide, located in Scott Valley, which he intends to make arrangements to prospect thoroughly. If he can get rock that will average 50 ounces to the ton, he thinks he will succeed in making a good stake. Rich specimens of silver ore have also been found on headwaters of Sacramento river in the Trinity range west of Sisson, the ledge being about 20 feet wide.

Tuolumne.

BALD MOUNTAIN.—Sonora Independent, May 7: If the several owners of mines along the western slope of Bald Mountain would form one giant company, each accepting shares pro rata, and then hydraulic the whole face of the mountain, from St. Cyr's ranch to Yankee Hill, we believe it is not too much to say that every man who held a share in the company would be made wealthy. As the mining is now carried on it is very expensive, comparatively speaking. A few get rich, some secure a living and a few make nothing. It would pay to sink individuality and petty jealousies, and let every one acquire wealth by uncovering the immense deposits of gold which every one knows lie hidden in the face of Bald Mountain. Immense pockets have been and still are being found. But they are scattered, and very few indeed search successfully. Let us introduce a new era of mining. Hydraulic the whole hill off. There's millions in it. The present Congress will probably not accord the privileges the hydraulic miners ask, but the matter can be, and should be adjusted. With millions upon millions of dollars of placer gold lying along the face of Bald Mountain, there should be no obstacle of sufficient size to check enterprise. Override everything but the law and justice. There certainly is a way to hydraulic that mountain without injuring the property or rights of any one. Let go of our coat-tails, please, till we hydraulic out a million dollars or so just above Luis Page's tunnel, just to show what may be done.

NEVADA.

Washoe District.

CONS. CALIFORNIA AND VIRGINIA.—Chronicle, May 7: There has been extracted from all parts of the mine during the week 1161 410-2000 tons of ore, of which 368 770-2000 were shipped to the Eureka mill and 792 1600-2000 tons to the Morgan mill. The average assay value of the ore worked at these two mills during the week, 985 tons, was \$21.44. Bullion shipped to the Carson Mint, assay value, \$29,508.16. On the second day of May the Eureka mill was burned down, and since that time our ore has been shipped to the Morgan mill. On account of this disaster, the men in the mine who were engaged in extracting ore were laid off for two days, but have resumed work, as the Morgan mill has commenced working the ore.

OPHIR.—1465 level.—From the mouth of the north drift, from the drift run west from the winze 122 feet below the sill floor of the 1300 level, have continued our work in an easterly direction and extracted some ore therefrom. There have been raised to the surface during the week 16 tons of ore, the average assay value of which is \$29 per ton. From the workings in the Mexican mine, namely, from a crosscut run west from a drift run south from a crosscut run east from the bottom of a winze sunk 101 feet below the sill floor of the 1465 level of that mine, near its southern line, a south drift has been run 14 feet, crossing the Mexican south line and entering the Ophir ground. The face of this south drift is in ore which carries an assay value of \$13 to the ton.

MEXICAN.—On the 1465 level the crosscut running west from the drift run south from the crosscut running east from the bottom of the winze sunk down 101 feet below the sill floor of this level near the south line of the mine, has been extended 14 feet; total length, 43 feet; continuing in a quartz formation, assaying \$5 and \$6 per ton. From this west crosscut at a point 18 feet west from its mouth, a drift has been run south 14 feet, crossing the Mexican south line and entering Ophir ground. The face of this south drift is in ore which carries an assay value of \$18 per ton.

UTAH.—From west crosscut 340 level, at a point 590 feet from the shaft, the north drift has been extended 46 feet; total length, 66 feet; continuing in vein porphyry showing clay separations.

SIEIRA NEVADA.—The joint Sierra Nevada and Union west drift from the shaft, 900 level, is extended a total distance west of shaft of 1930 feet; face in clay and porphyry. The north drift from the Kenosha tunnel is advanced a total distance of 1021 feet; face in porphyry.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, is extended a total distance west of shaft of 1930 feet; face in clay and porphyry.

ANDES.—North drift from west crosscut No. 1, on 420 level, advanced 19 feet and connected with west crosscut No. 2. Work resumed in face of west crosscut No. 3.

BEST & BELCHER.—900 level.—East crosscut No. 1 has been advanced 18 feet through porphyry; total length, 122 feet. In west crosscut No. 1 all work has been on repairs.

GOULD & CUREY.—200 level.—North west drift,

435 feet west of shaft, has been advanced 19 feet; total, 253 feet; face in soft porphyry and stringers of quartz. 400 level—East crosscut No. 1, from northwest drift, has been extended 11 feet through porphyry and quartz; total, 26 feet. Are doing considerable repairing on the 300 and 400 levels. The joint north drift with Savage Company on Sutro tunnel level has been advanced 27 feet; total length, 431 feet; face in porphyry.

HALE & NORCROSS.—On the 900 level are stopping ore from above this level. Winze from this level near our north line was sunk during the week 20 feet; total depth, 85 feet; bottom in quartz and porphyry. Hoisted from this level during the week 162 cars of ore. 1100 level—Started a south drift from end of east crosscut and extended it 20 feet. Stopping ore from above and below this level. During the week hoisted from this level 292 cars of ore. 1300 level—Hoisted during the week 454 cars of ore. Shipped to Brunswick mill 430 540-2000 tons. Average assay of railroad car samples of ore shipped to Brunswick mill for the week, \$23.42; battery assay for the week \$15.90 per ton. Shipped from Brunswick mill to U. S. Mint, Carson, bullion of the assay value of \$12,845.07.

CHOLLAR.—Are doing the usual amount of re-amping on the 450 and 750 levels. The south drift, 1640 level, is out 184 feet south of north line; face in clay and soft porphyry. Extracted and sent to mill in the past week 374 1700-2000 tons of ore from the 930, 1100, 1150 and 1250 levels. Milled during the week 380 tons; on hand at mill, 95 200-2000 tons; average battery assay, \$25.34. The joint northwest drift from 1800 level of the Ward shaft has been cleaned and repaired 150 feet.

ALPHA.—The southwest drift from the 1800 level of the Ward shaft has been retimbered to the north line of the Exchequer.

WARN.—The southwest drift, 1800 level, has been retimbered to the north line of the Exchequer. The joint northwest drift, 1800 level, has been cleaned and repaired 150 feet.

EXCHEQUER.—The joint southwest drift from the 1800 level of the Ward shaft has been retimbered to the north line.

OCCIDENTAL.—The west crosscut from the south drift, 400 level, is in a total distance of 92 feet; face still showing stringers of pay ore. Have started to drift south from said crosscut on a seam of pay ore. The north drift is in 25 feet, face producing some pay ore. The north drift is in 14 feet, face showing \$20 ore.

CON. NEW YORK.—The north drift from the top of the rise from the 650 level is out 58 feet; face in low-grade quartz. During the week have started a north drift on the ledge from No. 4 crosscut, 650 level; face in fair grade ore.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 710 feet; face in clay and porphyry.

Cortez District.

A DRAFT.—Eureka Sentinel, May 7: We learn that, on account of the low price of silver, work upon the Cortez mines has been almost suspended. The mill, which was closed down a few weeks ago on account of a scarcity of wood within reach for fuel, is not to be started up again, and no more ore is to be broken in the mine until silver again comes up to a price that the company may consider sufficiently profitable to resume work. A number of men have been drafted from the mines, and the only work at present continued is in driving a burleigh drift on the 500-foot level. This, it is understood, is being done to keep a few married men in employment. If that be true, a great deal of credit is due to Mr. Wenban, the principal owner and manager, for kind and humane consideration.

Reese River District.

WAGES REDUCED.—Austin Reville, May 5: The Reville is informed by Superintendent Earles of the Anstin Mining Company that miners' wages will be reduced to \$3 per day to-day. This reduction is necessitated by the great discount on silver, as the property cannot be worked unless expenses are reduced. When the price of silver goes above a dollar an ounce, wages will be increased. Austin is 90 miles south of Battle Mountain, and nearly all the necessities of life are high, but men must work for what are called low wages there and the mines will close.

Eureka District.

ORE SHIPMENTS.—Sentinel, May 5: The Eureka & Palisade Railroad Company received for shipment to Salt Lake during the month of April, 1615 tons of ore from the mines of this district, as follows: From the Eureka Con. mine, 600 tons; Diamond, 359 tons; Bullwhacker, 270 tons; Richmond, 150 tons; Williamsburg, 60 tons; Jackson, 35 tons; Phenix, 60; and the Mynbeer, 21 tons. From Paul Bros., lessees, Hamilton, White Pine county, 10 tons. Owing to heavy snowstorms and bad roads, shipments from the Diamond mine for April were light. There is a large quantity of ore at the mine already sacked, and the teams are hauling at the rate of 30 tons per day. The Bullwhacker mine is not looking well, and the shipments from there for May will, it is expected, be light. If the roads remain in their present condition, the Hamburg Company will probably ship 200 tons and the Ruby-Dunderberg Company about 150 tons, and the total ore shipments for the month of May will probably reach 2300 tons. A new ore bin is in course of construction at the Diamond mine. This is intended to give more room for ore, which is often required. The lessees of the Eureka Con. dump are well equipped for jiggling the furnace products, and are making fair wages.

BRITISH COLUMBIA.

MAKING THE SLOAN DISTRICT ACCESSIBLE.—Nelson Miner, May 3: The Provincial Government, through its local representatives, is making every effort to make the Sloan mining dis-

trict easily accessible. Old trails are being repaired, new ones constructed and others projected. To better carry out the work, Gold Commissioner Fitzstubbbs made a trip to the mouth of Carpenter Creek and personally instructed the foremen as to what was wanted and what was expected of them. Twelve men are now at work cutting the trail up Carpenter Creek, and as many more are employed in completing the old trail from the big creek to the lake and repairing and straightening it between the big creek and the railroad. An appropriation of \$1500 has also been made for a trail from Arrow Lake via Nakusp Creek. The promptness with which the Government acted on the suggestion to survey the townsite at the mouth of Carpenter Creek will also tend to bring about confidence, so much needed in new camps.

INDICATIONS GOOD.—The easiest way to reach the Priest Lake country is from a point on Kootenay river. Fred Sntter, who is well known at Nelson, says the locations in that district are farther north than first reported. The claims are only about eight miles south of the boundary line. He and others intend to do considerable development work this summer and will try and ship out a carload of ore. The country is new, and but little prospecting has been done, but the indications are good.

DAKOTA.

NEW MILL.—Deadwood Review, May 3: It is now practically determined that the Homestake company will shortly commence the erection of a 200-stamp mill in the vicinity of Central. The purchase of the Monitor water right furnishes them sufficient water to operate it, and the company is steadily buying up the various properties on the free gold belt in and around Central. These are even more extensive than the Homestake belt, and, in places, run considerably higher. The veins are overlaid with cement, which carries enough gold to pay for working, and hence the development will not cost anything. The erection of this mill will add greatly to the production of gold in the Black Hills.

The Mine Disaster at Roslyn.

On Tuesday afternoon a terrible explosion occurred on the slope of No. 2 mine at Roslyn, Wash., where are located the great coal mines of the Northern Pacific R. Co. The mines are located 28 miles northwest of Ellensburg, the county seat of Kittitas county. As far as known, some 50 miners lost their lives by the explosion. Relief forces were at once put at work, and many of the bodies have been recovered.

The slope in which the explosion occurred runs from No. 2 down to the point where the proposed shaft will be sunk, and is a couple of thousand feet in length. Seven levels have been worked in the slope.

George Harrison, the acting superintendent, says the works were examined thoroughly every morning by a competent foreman, and reports of the condition of all parts of the mine are placed on a bulletin board at the entrance. If there is any danger, the miners are forbidden to go in until the foreman removes the danger. These haultins are recorded in a book as well as on the board, and these reports are signed daily at noon by the mine boss.

The main slope is 13 feet wide and 2600 feet long, with an average downward pitch of 18 degrees, and double side entries turn away every 300 feet, one being an air course and the other an entry proper. Manways are driven, one on each side of the latter, 50 feet from the slope, leaving a 50-foot solid pillar between them and the slope. There are ways to furnish air and to permit miners to travel to and fro, so that they can keep off the slope, and a large cyclone fan forces air into the slope.

It is too soon to fix the blame of this occurrence where it belongs, but this is of the class of preventable accidents where proper precautions are taken. Of course the men themselves are often to blame for carelessness, but as often the companies are to blame for not adopting all the precautions against firedamp. The presence of gas can be detected, and caution can prevent accidents from its accumulation. We have not had many coal mine accidents on this coast, but then we have not many coal mines. A thorough investigation will doubtless ensue. Whatever the cause, a number of bread winners have been killed and their families left destitute. Funds are being raised for the relief of the widows and children.

HON. WARNER MILLER, president of the Nicaragua Canal Co., will arrive here on Saturday morning from Portland, Oregon. He was received at Seattle, Tacoma and Portland by all the commercial bodies, and has succeeded in getting some very liberal subscriptions to the stock and bonds of the canal company. He will remain here a few days, when he will visit Los Angeles, going from there to Galveston, Texas. From there to St. Louis, to attend the National Nicaragua Canal Convention, to be held June 3d. Nicaragua Canal matters are looking very bright, and the great work will be probably completed in the near future.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO. AMT. LEVIED.	DELINQUENT AND SALE.	SECRETARY.
Alpha Cons M Co, Nevada	150	April 15, May 15, June 5	C E Elliott, 308 Montgomery
Brunswick Cons M Co, California	8	April 15, May 15, June 5	J Stadfeldt, Jr, 308 Montgomery
Confidence M Co, Nevada	2	March 30, May 3, May 25	A S Groth, 414 California
Diana M Co, Nevada	8	May 3, June 10, June 30	K Grayson, 331 Pine
Edipse M Co, California	1	April 23, May 25, June 15	O Tum-Siden, 402 Montgomery
Golden Prize Cons M Co, Nevada	6	Feb 23, June 3, June 23	J F O'Neil, 310 Pine
Gold Mountain M Co, California	2	March 29, May 3, May 23	J F O'Neil, 310 Pine
Gray Eagle M Co, California	28	April 14, May 23, June 14	A W Barrows, 303 California
Hale & Norcross M Co, Nevada	101	March 24, April 28, May 20	A B Thompson, 308 Montgomery
Judith M Co, Nevada	150	May 2, June 6, June 27	R E Kelly, 419 California
Kentuck Cons M Co, Nevada	30	March 31, May 5, May 25	D O Bates, 308 Montgomery
Leemotiv M Co, Arizona	15	April 7, May 9, May 27	H Fish, 309 Montgomery
Occidental Cons M Co, Nevada	10	April 6, May 9, May 31	A K Durbin, 309 Montgomery
Rey Belcher & Miles M Co, Nevada	10	April 8, May 12, May 31	E B Holmes, 308 Montgomery
Silver Hill M Co, Nevada	30	March 31, May 5, May 25	D O Bates, 308 Montgomery
Siskiyou Cons Quicksilver Co, California	3	March 15, April 25, May 19	E F Stone, 306 Pine
Yellow Jacket M Co, Nevada	51	May 9, June 14, July 15	W H Blauvelt, Gold Hill

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Adams Hill Cons M Co	Annual	J N Pike, 320 Pine	May 16
Christy M Co, Utah	Annual	G R Spinnay, 310 Pine	May 16

LATEST DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, California	10	L Osborne, 308 Montgomery	April 23
Champion M Co, California	10	T Wetzel, 310 Pine	May 10
Cons Cal & Virginia M Co, Nevada	50	A W Havens, 309 Montgomery	Aug 17
Eureka Cons M Co, Nevada	25	H P Bush, 101 Sansome	Jan 5
Grand Central Cons M Co, Nevada	25	A B Thompson, 308 Montgomery	May 10
Pacific Coast Borax Co, California	100	H Clough, 230 Montgomery	May 10
Standard Cons M Co, California	10	J W Pew, 310 Pine	April 26

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 3, 1892.

474,002.—CONVEYOR—J. H. Diel, Stockton, Cal.
474,003.—ELECTRIC LAMP HANGER—E. Dills, Sprague, Wash.
474,237.—BLOTTING PAD—R. Frost, Olympia, Wash.
474,055.—PRUNING IMPLEMENT—L. J. Gilman, Santa Rosa, Cal.
474,247.—CAR VENTILATOR—Heath & Milzer, Sacramento, Cal.
473,933.—RIDING HARROW—R. I. Kirby, Pomeroy, Wash.
474,090.—CAR COUPLING—J. C. Look, San Jose, Cal.
474,177.—RIVETING MACHINE—E. D. Middlekauff, Stockton, Cal.
474,099.—PREPARINO FIGS—Geo. W. Resmer, Forest Hill, Cal.
474,105.—FRUIT CARRIER—Geo. W. Stevens, S. F.
474,153.—BALANCE SLIDE VALVE—W. J. Thomas, Sausalito, Cal.
473,981.—MUSICAL INSTRUMENT—A. P. Venen, Seattle, Wash.
474,276.—FRUIT BOX—C. W. Weston, S. F.
473,985.—VEHICLE HUB—W. H. White, Los Angeles, Cal.

The following brief list by telegraph, for April 26 will appear more complete on receipt of mail advices:

California—San Francisco—Josiah H. Tuck, conveyor; William H. Obmen, compound steam engine; John Hammond, railway car; Hans C. Behr, steam engine valve gear; Joseph H. Hoadley, steam generator and portable steam generator; Frank Roller, manufacture of explosives; Richard Schumann, Sacramento, orchard cultivator; William A. Galbraith, San Diego, ratchet washer for bolt nuts; James A. Cole, San Jacinto, plow; Joseph W. Fawkes Sr., Burbank, cultivator; Jacob Price, San Leandro, cotton press.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail, on telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FRUIT CARRIER.—George W. Stevens, S. F. No. 474,105. Dated May 3, 1892. This is an improved compartment box or case which is adapted to the transportation of fruits and the protection of each article in a separate cell by itself, with means for ventilation and reinforcing devices for the sections of the carrier. A company has been formed in this city to manufacture this device.

PRUNING IMPLEMENT.—L. J. Gilman, Santa Rosa, assignor of one-half to A. Westrup. No. 474,055. Dated May 3, 1892. This invention relates to that class of pruning shears in which the blade is so arranged as to have what is known as a "draw cut." The object of the invention is to simplify the construction of the shears and to increase their power, durability and general effectiveness.

METHOD OF PREPARING FIGS.—George W. Resmer, Forest Hill, Placer Co. No. 474,099. Dated May 3, 1892. This consists of a novel process of preparing figs, whereby they are reduced to a condition adapting them for subsequent manipulation and by subsequent steps making a complete commercial product or article of manufacture. The object is to provide a fig product with flavor unimpaired, having lasting qualities, easily handled for commerce, ready for use by the housekeeper, and forming a laxative food easily obtainable.

CAR COUPLING.—John C. Look, San Jose. No. 474,090. Dated May 3, 1892. This is one of that class of car couplings known as the "vertical plane," and of that class which has pivoted hook heads and pivoted guards. It has the peculiar merit of being a flat-face hook head in combination with a pivoted guard, whereby the flat-face hook-head coupling is made entirely automatic. It consists of a draw-bar with pivoted hook head and a buffer arm, with a

guard pivoted to the buffer arm, and actuated by a spring from the car to press the guard toward the hook, and to let it yield on coupling with an opposite head. A side spring from the car acts in opposition to the one on the guard, and the two, in connection with a stop, hold the coupling in the required position when the cars are separated. A vertical bolt locks the pivoted head, and a lifting bar is placed underneath the bolt, with chain connection to the side of the car for uncoupling.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING April 20.	WEEK ENDING April 27.	WEEK ENDING May 5.	WEEK ENDING May 12.
Alpha	20	25	15	30
Alta	65	70	80	75
Anda	50	60	50	70
Belcher	1.25	1.45	1.20	1.35
Belle Isle	10	15	15	20
Best & Belcher	2.05	2.45	2.20	2.30
Bullion	55	59	1.03	1.05
Bodie	45	50	55	60
Bulwer	50	46	50	45
Commonwealth	10	10	15	20
Cons. Va. & Cal.	3.85	4.35	4.20	4.10
Challenger	50	50	50	50
Chollas	85	80	85	1.05
Confidence	1.05	1.50	1.30	1.25
Cons. Imperial	10	10	10	10
Oleontia	20	20	20	20
Crocker	55	1.20	1.20	1.15
Del Monte	30	30	20	25
Eureka Cons	2.00	2.00	2.00	2.10
Exchequer	31	38	35	40
Grand Prize	10	10	10	10
Gould & Curry	1.30	1.30	1.30	1.30
Hale & Norcross	99	1.15	1.40	1.30
Julia	65	65	65	65
Justus	20	15	15	20
Kentuck	10	10	10	15
Lady Wash	10	10	10	15
Mono	70	70	70	75
Mexican	1.20	1.55	1.40	1.65
Nadie	15	15	15	15
North Belle Isle	15	15	20	25
Nev. Queen	70	70	1.15	1.15
Occidental	15	10	10	15
Overman	2.10	2.45	2.20	2.40
Potosi	55	65	70	60
Pearless	1.00	1.15	1.15	1.05
Per	1.60	1.20	1.50	1.25
S. B. & M.	20	20	15	15
Sierra Nevada	1.10	1.35	1.10	1.40
Silver Hill	35	40	35	40
Union Cons	95	1.25	1.35	1.10
Utah	35	40	35	35
Yellow Jacket	60	1.00	75	90

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Ref. in bulk.....	@ 14	English, D.....	@ 19
Powdered, do.....	@ 8	Ontario tool.....	@ 9
Concentrated, do.....	@ 74	8 1/4" Diam tool.....	@ 9
All grades selling at advance.		Pick & Hammer.....	@ 9
COPPER.		Machinery.....	@ 5
Bolt.....	@ 22	Two Oaks.....	@ 4
Sheeting.....	@ 22	KINFILATE.	
Ingot, jobbing.....	@ 14	A. V. steel grade.....	@ 23
Do, wholesale.....	@ 13	14x20, spot.....	@ 6
Fire Box Sheets.....	@ 24	Charcoal, 14x20.....	@ 6
IRON.		Do roofing, 14x20.....	@ 6
Bar, base.....	@ 3	Do do, 24x28.....	@ 12
Norway, base.....	@ 41	PILG TIN.	
PILG TIN.		Spot @ B.....	@ 23
Edginton @ ton.....	23	TO LEAD—PER TON.	
Giangarnock.....	24	Wellington.....	80
Langdon.....	1	Greta.....	7 25
Oregon Pig.....	—	Namaimo.....	7 25
Puget Sound.....	—	Cham.....	6 50
Clay Lane White.....	24	Seattle.....	7 00
Langdon.....	23	Ocos Bay.....	6 00
Thorpfield.....	24	Oauel.....	8 50
Gartbarrie.....	23	Egg hard.....	14 00
Barrow.....	23	Oumberland, in sacks.....	15 00
Oscar.....	23	Do, bulk.....	14 00
CHROME IRON ORE.		Walised.....	7 50
Per ton @.....	10 00	Scotch Split.....	7 50
LEAD.		Brynmawr.....	7 50
Pig.....	@ 41	West Hartley.....	8 00
Drop @ bag.....	1 80	TO LEAD—PER TON.	
Buck @ bag.....	2 00	Australian.....	@ 6
Chilled do.....	2 20	6 Liverpool Steam.....	@ 6 50
SILVER.		7 Scotch Split.....	@ 6 50
Home trade, pr.....	@ 43	6 Cardiff.....	@ 7 00
For export.....	@ 36	Lehigh Lump.....	@ 12
QUICKSILVER.		Cumberland.....	@ 13
English, to load.....	@ 90	Egg, hard.....	12 00
Do, spot, in bulk.....	@ 90	West Hartley.....	@ 7 50
Do, in sacks.....	@ 12	OKE.	

News has reached Carson that the final arrangements are being made for the sale of the Inyo canal and the soda works at Keeler to some English capitalists. These properties are new largely owned by Carson people. The new soda company will put up a large plant and expect to ship 20,000 tons of soda a year.

MECHANICAL PROGRESS.

The Rapidity of Fire in Machine Guns.

The rapidity of fire with a single-barreled machine gun forms the subject of a letter of Mr. H. S. Maxim to *Engineering*. This letter is brought out by a new item, stating that a gun made by the Winchester "fires 1000 rounds a minute and beats the Maxim gun with its 750 rounds per minute." Mr. Maxim says his first gun officially tested at Enfield discharged 1000 cartridges in 11.2 minutes, or 666 per minute. This was with the Royal Woolwich cartridge, the most perfect then made. In another trial in Switzerland, with German Mauser cartridges, the rate of fire was 612 per minute. With the new Austrian cartridge with compressed powder, a speed of 770 shots per minute was attained. The highest rate of fire ever reached by an automatic gun, deriving all its energy from the recoil, was 775 shots per minute, made with cartridges made in the United States by the Union Metallic Cartridge Co.

About two years ago Mr. Maxim constructed a gun to utilize the force of the escaping gases at the muzzle to operate the mechanism. With the French Label cartridges a speed of 1100 to 1200 shots per minute was attained with this gun. But both French and German officers decided that the rate of fire was altogether too high, and they expressed the wish that he would reduce rather than increase it, and this was done. The first 1-pdr. Maxim gun fired at the rate of 400 shots per minute, and this speed was afterward reduced to 300 shots.

The effect of rapid firing upon the chamber and rifling of the gun is most marked, says Mr. Maxim. In Austrian trials, with a 600-shot per minute rate, with steel covered bullets, but with frequent stoppages to replace the ammunition boxes, the gun made as good a target after 20,000 rounds as at starting. But with a speed of 670 shots per minute and practically no stopping, the bore was considerably injured after 10,000 rounds.

Mr. Maxim thinks that with a single-barrel gun, with both gun and cartridge made expressly for the maximum speed, and utilizing both the recoil energy and the escaping force of the gas, a speed of 1500 to 1600 shots per minute might be attained. But at this rate the barrel would be very highly heated, even if inclosed in a water casing.

The greatest absolute speed of fire yet attained with machine guns operated by hand and with more than one barrel, is given as follows: With the 12-barrel Nordenfeldt, each barrel 100 rounds per minute, the Gatling 10-barrel, 100 rounds per barrel per minute; 5-barrel Nordenfeldt, with three trained operators, 400 to 500 rounds in all; 2-barreled Gardner, with four men, 333 rounds per minute. Mr. Maxim has fired a 3-pdr., with cartridges 21 inches long, at the rate of 40 rounds in 50 seconds, which is the best record he knows of for heavier guns with only one man attending.

Asphalt in India Rubber Compounds.

From the beginning of the rubber business manufacturers have appreciated the use of asphalt and tar in a variety of rubber compounds. Especially has this been true in goods cured in what is known as the dry heat. Boots and shoes, clothing and insulated wire compounds to-day all have a certain percentage of what is known as tar, but which is usually purified asphalt. The common belief that the goods are injured by the addition of this substance is wholly erroneous; a certain amount of asphalt compounded with rubber assists in calendaring, and during vulcanization imparts a certain toughness to the rubber which is not to be gained in any other way. The proportion used to-day is but small. For example, what would be known as a rich compound is 18 pounds coarse Para, 11 pounds litharge, 40 pounds whiting, 3 pounds asphalt, $\frac{1}{2}$ pound lamp-black, $1\frac{1}{2}$ ounces sulphur. Exactly what asphalt is very few people seem to know, and it is almost invariably in the popular mind confused with coal tar. Asphalt as a paving material has been known since the Babylonian empire, and to-day paving blocks are found that preserve their integrity and have hardly begun to oxidize, in spite of the atmospheric changes to which they have been exposed. It is only within late years that asphalt has been well known in the United States. It looks very much like pitch, and when ignited burns with a bright flame, giving off a dense black smoke. Alcohol, ether, oil of turpentine, naphtha, and many other reagents easily dissolve it. Its specific gravity is 2.23.

Until very recently all the real asphalt used in this country was imported. There is in the island of Trinidad a lake nearly two miles in circumference which is the source of the most of it, and it is said that near the shore the asphalt is very hard, but out in the center it is soft and viscid. When imported to the United States it comes mixed with sand and gravel and a variety of foreign materials, from which it is separated by heating over a slow fire for a week or more. During this heating process the impurities of a lighter nature rise to the top and are skimmed off, while the heavier substances settle to the bottom of the receptacle. There are very large deposits of asphalt in France and Switzerland, and within the last three years quite extensive deposits have been discovered in Utah and California, and small ones in Kentucky. For paving streets it is prepared by grinding first to a powder and mixed with crude petroleum and fine sand. It is then molded into blocks of suitable size, or sometimes it is poured between blocks of paving stones, when it becomes hard, and greatly resembles the natural rock.

Another use for asphalt is in the manufacture of black varnish, where it is dissolved in oil of turpentine and linseed oil and makes an exceedingly durable coating. For insulating electric wires this sort of coating has been found of great use, and it is said that one of the best rubbers for wires to-day manufactured is made of a fine compound containing 30 per cent of India rubber, the compound after semi-vulcanization being dipped in boiling asphalt, which toughens it exceedingly. As asphalt is not affected by acids or gases, and is an absolutely waterproof compound, and as heat and cold do not affect it, it is a valuable article to use in connection with India rubber, although if too large quantities of it are put in, it shortens the gum and may, during the process of vulcanization, cause it to blister. A great deal of the gum-roofing sold in the United States, which is thought to be India rubber or gu-ta percha, is made simply from a solution of asphalt spread upon prepared paper. —The India Rubber World.

ROLLING RAILS.—The process of rolling railroad rails of Bessemer steel, as practiced in Germany, says *Machinery*, is declared to be one of the most perfect mechanical operations in the world. The steel is cast in blocks which contain sufficient material for two or three rails, these blocks, while still red hot, being carried to the preparatory rolling mills by horses which have been trained to work in the midst of this fire and noise; here they are kept hot, in special furnaces, and are rolled into longer blocks having a square cross-section. After being thus prepared, they are taken to the rail rolling mills, which consist of two complete rolling mills, with all the appurtenances in one apartment, and the blocks which come from the preparatory mills are heated again and then passed between the rollers, of which there are three placed one above the other, so that the rails are rolled during the backward as well as the forward motion without requiring a change in the direction of rotation of the rollers. The rails have to pass back and forth between the rolls 13 or 14 times, and each time that they come from the rollers they are caught by the workmen on the short, bent ends of long levers which run on rollers on movable carriers. Each time the rail passes from between the rollers it is longer, and its cross section narrower than after the former rolling, until it finally stretches itself out like a gigantic frey snake. It is then taken to a circular saw, which cuts through the glowing metal with perfect ease, dividing the long bar into two or three rails. The cold ring is now put under presses, by means of which the slightest irregularities are removed, and then the bores are bored, the end surfaces evened, etc.

DOUBLE-BARREL BOILER.—The *Engineering News* says that a locomotive with a double-barrel boiler has been designed by the mechanical engineer of the Eastern railway, of France, and has been built at the company's works. The lower barrel is filled with tubes, and is connected with the upper barrel by three necks and by the throat plate of the firebox shell. The object is to have a boiler of large capacity without increasing the diameter beyond 4 ft. 4 ins., so that it may fit between the driving wheels. The engine is of the eight-wheel type, with outside cylinders at about the middle of the engine, and driving the rear pair of driving wheels, this arrangement being considered best for high speeds. The valve motion is also outside. The four driving wheels are 6 ft. 6 ins. diameter, and there is a four-wheel leading truck, with plate frames, and outside bearings. The engine is designed for hauling heavy passenger trains, and maintaining a continuous high rate of speed.

SCIENTIFIC PROGRESS.

Action of Frost on Cotton.

At the last meeting of the Manchester Section of the Society of Chemical Industry, a short communication by Mr. C. F. S. Rothwell, on "The Action of Frost on Cotton," was read. The literature published on this subject, said the author, gave the idea that cotton was "tendered" by frost. To quote Hummel's "Dyeing of Textile Fabrics," "the evidence on this point was conflicting, and it was quite conceivable that the crystallization might act injuriously in a mechanical way, and that the atmospheric ozone might also exercise some slight destructive influence." This uncertainty might be attributed to the fact that, until recently, no reliable machine for testing the strength of the cloth was available. To decide the question, two pieces of "madder bleached" cloth, one of good and the other of very poor quality, were placed in water for ten minutes, withdrawn, and without squeezing were exposed to a temperature of 4° C. (28° F.). The cloth was quite stiff in three minutes, and, when the ice had evaporated, its strength was tested in Goodbrand's machine against some of the original cloth, when the breaking weights were found to be identical. The trials were repeated, the cloth being frozen for 16 hours. In this case also the strengths were found to be identical. It was thus evident that cotton was not "tendered" by the freezing of water within it, at any rate not when in the ordinary width. If the fiber were compressed to a greater or less extent, as would happen at the bottom of a wagon load, the cloth might probably be weakened mechanically by the crystallization of the water, but he had no proof of this. The prevailing opinion that cloth was weakened by frost had, no doubt, arisen from the fact that when the fibers were frozen stiff they were easily snapped, but any stiffening body, such as gum, would have the same effect, and this had obviously nothing to do with the actual strength of the fiber. —*Textile Mercury*.

CIRCULAR MAGNETIZATION.—At a recent meeting of the Edinburgh Royal Society, Prof. C. G. Knott read a paper on the magnetization of iron by a current passing through it. The experiments were an attempt to get some insight into the nature of circular magnetization as it exists in an iron wire carrying a current. Direct experiment seemed hopeless. Accordingly tubes were used in which the circular magnetization was measured by the induction current produced in a coil wound longitudinally round the wall of the tube. The circular magnetization could be produced either by an axial current along a copper wire threading the tube, or by a sectional current from end to end along the tube itself. Several tubes of different bores were used in pairs, the induction, axial or sectional, in one, being balanced, by adjustment of resistances in the secondary circuits against the induction, axial or sectional, under the influence of the same current in the other. The average magnetic force acting round the tube was calculated in accordance with the usual assumptions, and this, taken along with the observed induction, gave an average permeability. The general result was that the sectional induction accompanying a given current is greater by about seven per cent than it would be if the usual theory as to the relation between it and the axial current were accurate. Direct experiment appreciably showed that a current flowing through iron does not increase permeability to inductive forces acting perpendicular to the current, so that the deviation mentioned must be due to the faultiness of the theory. With greater current densities, this deviation may be even more pronounced.

CARBONIC OXIDE.—When, in firing steam boilers, the coal or slack comes in contact with an insufficiency of previously heated atmospheric air, carbonic acid is generated, which, in the presence of an excess of carbonaceous fuel, becomes transformed into carbonic oxide. This latter gas, impinging upon the boiler plates, mingles with a fresh quantity of heated air, enters into combustion, and gives out considerable heat. Then, leaving as residue carbonic acid, it goes up the smokestack after giving up its caloric, more or less completely according to the arrangement of fire-grate and flue tubes, while raising the temperature of the air for supporting combustion. In all these reactions, the nitrogen of the incoming air remains perfectly inactive, while drawing along with it through the furnace a considerable quantity of heat which is entirely wasted. To reduce this loss to a minimum,

Herr Siemens has designed a boiler furnace, which he feeds with the products of combustion drawn from the smokestack, thus utilizing the carbonic acid already generated. It is found that by this arrangement the coal gives a better yield of caloric power, by suppressing the formation of carbonic acid, and also by diminishing the quantity of atmospheric air, and therefore of nitrogen, passing through the furnace. —Chicago Journal of Commerce.

COLOR PHOTOMETRY.—The following suggestion for determining the constitution of light has been sent to the *Optician*. It is clumsy as compared with methods involving the application of the spectroscopic, but we publish it for what the idea may be worth. A disk of thin metal has two annular rows of sector-shaped apertures. The apertures of the innermost of these two concentric rings are each closed by a thin piece of ground glass. Each of the apertures of the outer row contains a piece of differently colored glass. The outer ring is, in fact, a transparent "Newton's disk," and when the apparatus is rapidly rotated, and the light to be tested is placed at some distance behind it, this light is transmitted by the outer circle of apertures with more or less modification according to the relations subsisting between the areas of the differently colored sectors of glass. Every transparent sector in the revolving disk is provided with an adjustable opaque screen or shutter, and the shutters can be adjusted either by stopping the disk or, while it is in motion, by mechanical arrangements that we have not space to describe. The shutters of the outer ring are adjusted by trial until the light transmitted by the corresponding glass sectors, when the disk is rotating, appears of nearly the same color with that transmitted by the inner ring. Next, the colorless inner sectors are, themselves, obscured until the luminosity of the two rings becomes equal. The adjustment of the outer row of shutters is completed, and the composition of the light is deduced from the relations between the exposed areas of the colored glasses. Substituting reflection for transmission, it is evident that the same process of color photometry could be carried out by the aid of an ordinary "color top." It could also be arranged that light from two or more sources should be directly compared.

THE CALORIFIC CAPACITY OF METALS. Mons. Le Verrier has investigated the specific heat of various metals at high temperatures. He has experimented on iron, copper, aluminium, zinc and lead. He showed, in *La Nature*, that if the results be represented by means of a curve line, having the temperatures for abscissas, the numbers obtained are indicated by two sections of straight lines joined to each other, in a certain thermic part, by a curve line. Mons. Le Verrier finds that these suture curves do not remain identical for the same metal accordingly as the experiments have been made at a rising or a lowering temperature; whence results that the body preserves, from a caloric point of view, traces of the condition through which it has previously passed. Mons. Berthelot, further, observes that although this result may be novel with respect to metals, it only confirms those which are supplied by various bodies in organic chemistry, chloral hydrate for instance, of which the caloric of fusion is 4000 calories, but which leaves only 2000 calories in solidifying. Waxes present similar phenomena, which may be attributed to a molecular change in the state of the body.

ECLIPSES.—Every year there must be two eclipses of the sun, and there may be five. These are partial eclipses, however, except in the comparatively rare case in which the moon passes nearly centrally over the sun's disk and produces a total obscuration of his light. Since the invention of the spectroscopic, in 1860, there have been barely a score of total eclipses, and a number of these could not be observed because the belt of totality fell at the earth's polar regions or upon the oceans. The belt of totality is a narrow strip—never more than 170 miles wide—where the point of the moon's shadow falls upon the earth. Total eclipses rarely recur, therefore, at the same point of the earth. At London, for example, there has been no total eclipse since the year 1140 except that of 1715, and there will be none during the next century. —Prof. E. S. Holden in the April Century.

A COLLECTOR'S OUTFIT.—At the last meeting of the San Francisco Microscopical Society, George Otis Mitchell exhibited a novel and inexpensive collecting apparatus he had lately constructed, with slight modifications from those heretofore used. It consists of two wired tin rings, the outer slipping over the inner and securing the net

of holding cloth. The net narrows downward, the lower end being the size of a wide-mouthed, two-ounce bottle, around which it is fastened with a piece of cord. A socket fastened to the ring is of a size admitting the ferule of a walking-cane, which enables the collector to sweep through the water at a considerable distance from the shore. Mr. Mitchell thought a collecting apparatus of this kind would often secure specimens of animal and vegetable life, when the most assiduous work with the ordinary method would show nothing of interest, or only such as are very numerous. With his apparatus he was enabled to secure quantities of that most beautiful and elusive fresh water alga, *Volvox globator*, at any time he chose to take a dip in Mountain lake.

ELECTRICITY.

Electric Traction on the Southern Pacific.

The electric motor is not only crowding out other sources of power in street railway traction, says the *Electrical Review*, but is opening competition with the steam locomotive in a field which has heretofore been the exclusive property of the latter. The high speeds attainable will eventually make it a winner for long distance work. A few months ago we described an electric locomotive put into operation near Boston for shifting freight cars. We have just learned that five of the great railway companies of the country have been inspired with sufficient confidence in electric traction to come into consultation, with a view to its adoption for handling the suburban traffic of the large cities, and one of them, the Southern Pacific, has placed an order with the Walworth Manufacturing Company for trolley poles to install such a plant on its lines. This is the entering wedge in what will ultimately result in a general application of the electric motor to railroad work, and, after a short period of service for suburban traffic, engineers will be called upon to design a system for interurban traffic. The adoption of the electric motor would be a boon to a community like Chicago, where the smoke from the numerous locomotives of a score of railroads centering at that point hangs like a pall over the blighted city. To the railroad companies this step means reduction of operating expenses, a style of appeal which brings certain conviction of its merit. In lieu of a hundred different fires and boilers, with the great attendant waste necessarily incident to development of small power units, a single generating plant can be used; the saving in fuel under such circumstances will be considerable. It will also enable more work to be handled without increasing the pay roll of employees. The fireman now necessary in each locomotive can be transferred to other work.

Oil as an Insulator.

The experiments on high-tension discharges of high frequencies described in the *Electrical Engineer*, by Prof. Elihu Thomson, besides illustrating the simple methods required to obtain brilliant discharge effects seemed to point to some remarkable properties of oil as an insulator, and Professor Thomson has referred to the great future which the application of oil insulation opened up in the field of high-tension transmission. Continued experiment, however, has developed facts which have led Prof. Thomson to modify his views somewhat on the subject of oil insulation, and in reply to a letter on this subject he writes the *Engineer* as follows:

"It is more than probable that I shall have to make a revision of my views as stated in relation to oil as an insulator. In conducting my experiments, I have been testing the striking distance in oil with varying periodicities and with varying forms of discharge electrodes, and I find that the results would seem to indicate that with an oil such as we have been using for the insulation of the high-period discharges at enormously high voltages, there is a much less resistance to discharges of the ordinary alternating character at low rates, such as 125 periods, or 250 alternations.

"I find that considerable distances in oil are punctured. In fact, the distances in some cases are quite comparable with the distance which the discharge leaps in the air. I find, also, that with high-period currents, such as I get from my high-period alternating machine giving from 3000 to 5000 or more alternations per second, different effects are obtained; though the experiments are not yet complete.

"One of the most curious things noticed in the conduct of the experiments has been the time which it takes to break down the

oil. For example, for a short contact of a half second or so, oil even in fairly thin layers seems to insulate, but if the contact be continued over some seconds, or even to half a minute or more, the discharge may break through the insulating layer. The time taken seems to increase with the distance of the electrodes apart under the oil. I have given these preliminary results hoping to investigate the subject pretty thoroughly and to really understand something about oil as an insulator before we get through."

Current Required for Incandescent Lamps.

The *Electrical World* receives many inquiries from correspondents asking what currents incandescent lamps of certain voltages will take. In some respects this question is like the one asking what the size of a stone is. The best reply that can be given, and the only really satisfactory way to get a fair average, is to place a number of these lamps, say 10 or 100, on a circuit and measure the current with an amperemeter, first being sure, however, that the electromotive force is the right amount. A good voltmeter and ammeter are therefore required. To ask the lamp sellers appears to be of little use, and would probably be unsatisfactory, as they will either not reply at all or give an evasive answer; or if they give any figure, it is apt to be lower than the true amount, which overestimating of efficiency seems to be considered a manufacturer's license. A very good custom, which seems to be growing among lamp manufacturers, is the rating of lamps by their efficiency in watts per candle, and whenever such figures can be obtained, the current required by a lamp is very easily calculated. The usual efficiency is about four watts per candle, which, multiplied by the alleged candle power and divided by the stated voltage, will give the current in amperes. As lamps may be ordered for a given efficiency, this figure may be relied upon to a certain extent, as it is then accompanied by a sort of guarantee on the part of the makers. The Edison Company makes lamps of 3.1, 3.6 and 4 watts per candle. The Thomson-Houston lamps are for 3.32, 3.5 and 4 watts for 52, 75 and 100-110 volts respectively. The Economic Company's lamps are for 3.8 watts, and the Germania for 4 watts. The lower this figure, the more economical the lamp will be, but in general the shorter the life. Low volt lamps, as a rule, use less watts per candle than those of high voltage, for the same life. The wireman will be safe if he assumes the larger figure, namely, four, as his wires will then at least not be too small. With these figures, provided the lamps really have the alleged candle power, any one can calculate the current required.

COST OF THE ELECTRIC LIGHT IN MILLS. Some remarkable figures have lately been published with regard to a 150-light installation in some large steam mills in Barrow-in-Furness. The installation was laid down in 1885, and includes a Mather & Platt dynamo, driven off countershafting from a horizontal Marshall engine, supplied with steam at 65 pounds pressure from the mill boilers. Taking the average for the six years, we have the following figures: Annual cost, £92; cost per lamp hour, .059d. The price of gas in Barrow being three shillings per thousand, the annual cost of an equal number of No. 5 burners consuming 5½ cubic feet per hour, would be £314. If we take the 16 c. p. Edison-Swan lamp as consuming on the average 80 watts, the lamp hour at .059d. is equivalent to the Board of Trade unit at ¾d., the price charged per unit in London being 7d. to 8d. The average life of each lamp at this phenomenal mill comes out at 3484 hours, and there are two or three of the originally installed lamps still burning which have run for 20,000 hours.

THE ELECTRIC LIGHT IN THEATERS.—Among the many devices now employed to utilize the electric light for producing beautiful scenic effects, says the *Electrical World*, is one which has just appeared at Proctor's Twenty-third Street Theater to represent a sunrise. A curved scene extends around the stage, part of which is painted on gauze so that light may shine through, and behind it is an elaborate system of incandescent lights. The controlling apparatus is so graduated that 50 different degrees of light and shade can be produced, thus causing the sunrise to grow imperceptibly. Another use of the electric current is to represent the explosion of a bomb. A paper shell contains just enough powder to explode and make a flash. This is fired by electricity, while at the same moment another circuit, controlled by the same key, sets off a gun behind the scenes, which furnishes the necessary noise.

ENGINEERING NOTES.

Transmission of Power.

One of the most timely papers read at the Buffalo Convention of the National Electric Light Association was by Carl Hering on transmission of power, special attention being paid to methods of utilizing and conveying to Buffalo a portion of the power of Niagara Falls. First, the author considered hydraulic, pneumatic and wire-rope transmission, giving as the efficiency of each, respectively, 18, 39 and 11 per cent for a distance of 13 miles. A rather novel way of dealing with the transmitting of power is that of considering the cost of transporting coal itself from the mines to manufacturing cities. In Philadelphia the price of a ton of coal is doubled by the cost of its transportation from the mines, and therefore an efficiency of only 50 per cent is obtained in the transmission.

The most essential portion of the paper, and the one of most value, since the author is thoroughly conversant with the subject, is that discussing the systems of electrical transmission. To be successful at all for long distances, requires the use of very high potentials, as otherwise the cost of the line would make it impracticable. Continuous currents, to be available, must be generated directly by the dynamo at that high potential, as there is no means at present known of converting a low-tension continuous current into one of high tension without the use of moving machinery. Experience and experiments have shown that it is not practicable to exceed 5000 or 6000 volts at the very most on continuous current dynamos. It is thought, therefore, that the field is left tolerably clear for alternating currents for the following reasons: 1. Because alternating current dynamos require no commutator. 2. Because such currents can be converted readily from a low tension to a high tension, and the reverse, with only a small loss in each transformation. An alternating current dynamo for generating low potential currents is the simplest type, and a transformer requiring no moving machinery is a very simple thing to take care of, if, indeed, it requires any attention at all.

The only important objection to the use of alternating currents is that they are not so suitable for running motors as direct currents are. The so-called synchronous motors are alternating-current dynamos used as motors. As their name implies, they must run at precisely the same speed as the dynamo, and many of them come to a dead stop if loaded so as to reduce that speed. The principal difficulty is found in the fact that they cannot be started readily, and all the load must be taken off before they can be started at all. The opinion is expressed that before very long this problem will be solved by several methods, so as to leave but few objections to the employment of alternating currents.

There are two ways of transmitting power to great distances by alternating currents. One, used at the Ferranti Station in London, is to generate high-tension currents at the dynamo and at the distant ends transform these currents into low-tension ones. The second is the method used successfully at Frankfurt, consists in generating low-tension currents, transforming them at the dynamo station into high-tension currents, which are sent over the line and then transformed back to low tension. This method Mr. Hering thinks to possess more advantages than the first.—Iron Age.

POPULARIZING AIR AS A CARRIER.—Owing to the increase in the number of air brakes used, most railway shops find it necessary to have their plants supplied with air pumps, with pipes leading to all important parts of the shops to be used in testing. Another way in which this air pressure can be used to great advantage is in the sending of small, light articles from point to point. The transfer of mail and messages from one office to another, particularly when they are located in the different stories of a building, is often a great cause of annoyance. The average messenger boy is not a very reliable person and is often not at hand when his services are demanded the most, which fact sometimes causes a delay in the delivery of important messages. It is probably questionable whether it would pay to establish an expensive system for this purpose, but there are a great many places about large plants where a short and straight line could be established. A very successful and convenient arrangement of this kind has been put in operation in at least one of our large railway shops. The tubes are made of heavy, galvanized iron, made by an ordinary tin-smith, and consequently the expense is not great. The carrier is made of the same material, with a piece of leather fastened on

one end forming a packing, and in the other end is driven a wooden plug to act as a guide and receive the shocks caused by the stopping of the carrier at the end of its journey. A very small amount of air is consumed in the transfer of a message, and instead of waiting for a messenger boy the messages can be delivered in a few seconds from either end of the line at any time. Two or three such tubes as these in a large plant might easily save the expense and annoyance of a messenger boy and prove a great convenience.—Railway Review.

USEFUL INFORMATION.

THE BEST LEATHER.—Experiments were recently made to determine which portion of a hide of leather gave the best results when made into belting, says the *Manufacturers Gazette*. Four strips, each 18 inches long and two inches wide, were cut and carefully tested in a machine. One of the pieces from the center of the hide broke at a strain of 2490 pounds, equal to 14.940 pounds per foot of width, while the strip from the upper part of the shoulder parted at 1130 pounds. The experimenter stated that double belts made with pieces from different portions of the hide were defective, the shoulder part being much more liable to stretch, and is not able to stand as much strain as the center. He claimed that a double belt would be much better if made from the same parts of the hide throughout, and that if made entirely of centers it would stand a strain of 30,000 pounds per foot of width, whereas a belt made from shoulders would hardly stand 15,000 pounds per foot of width.

ELECTRICITY AND WINDMILLS.—An electric-lighting plant, driven by a windmill, is in operation in a London flour mill, according to the *Engineer*. The windmill is of the well-known Halliday type, made by the United States Wind Engine and Pump Co. of Batavia, Ill. It is 30 feet in diameter. A reasonably uniform speed is obtained by the construction of the wheel. Whenever the force of the wind is such as to give the wheel the necessary speed, a connection is automatically made, and the wheel drives a dynamo, which furnishes current to a storage battery of 28 cells. An automatic switch reduces the current when the speed is too high, and prevents too much current being forced into the battery at any one time. The current obtained from the storage battery is sufficient to operate two 1500 c. p. arc and several incandescent lamps.

THE ELECTRIC CRANE.—Among the applications of electricity to machinery, says the *American Manufacturer*, that of its union with traveling cranes is of no mean importance. Instead of having a certain predetermined speed of travel and hoist, that cannot be departed from, the electric crane possesses the advantage of being under perfect control of the operator, can be gradually accelerated or retarded, smoothly and noiselessly, or may be kept at the same speed indefinitely. Three 15-ton cranes are in operation in a Milwaukee shop, having a hoisting speed of 25 feet per minute, a longitudinal traverse speed of 350 feet and a transverse traverse speed of 125 feet per minute.

QUICKSAND.—The reason a person sinks in quicksand is because the latter is composed chiefly of small particles of mica mixed largely with water. The mica is so smooth that the fragments slip upon each other with the greatest facility, so that any heavy body which displaces them will sink, and continue to sink until a solid bottom is reached. When particles of sand are ragged and angular, any weight pressing on them will crowd them together until they are compacted into a solid mass. A sand composed of mica or soapstone, when mixed with sufficient water, seems incapable of such consolidation.

A NEW miner's safety lamp, constructed to burn petroleum oil, has just been patented by Messrs. Richard Johnson, Clapham and Morris, of Manchester, England. The special advantage of this lamp is that while it combines every possible protection against the risk of igniting any explosive atmosphere in the mine, the light given is two or three times more powerful than that obtained with the ordinary safety lamps.

EVERYONE may not know that the Bank of England notes are made from new white linen cuttings, never from anything that has been worn. So carefully is the paper prepared, that even the number of dips into the pulp made by each workman is registered on a dial by machinery.

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SAN FRANCISCO:
SATURDAY, MAY 14, 1892.

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Another Silver Convention.

The National Silver Committee appointed by the First National Silver Convention, held at St. Louis November, 1889, believing that the exigency has arisen which calls for earnest consideration and united action on the part of the friends of bimetalism throughout the United States, has issued a call for a convention to be known as the Second National Silver Convention, to be held at Washington, D. C., May 26th and 27th, 1892. One of the objects is to organize a National Bimetallic Association or League for the better promotion of the cause of free bimetallic coinage in the United States.

The call is extended to all who earnestly favor the immediate restoration of free bimetallic coinage in the United States, and each congressional district is requested to send two delegates, and each State and Territory to send two additional delegates at large. Farmers' Alliance organizations, State Granges, Patrons of Husbandry, Knights of Labor, and all other industrial organizations favorable to the free coinage of silver, are also invited to send one delegate for each local organization. A cordial invitation is also extended to all citizens who, by pen or otherwise, have been advocates of bimetalism.

Members of Congress and of the Legislatures of the several States who favor the restoration of the bimetallic standard and the coinage of silver on the same terms as gold are especially invited to attend and participate in the proceedings of the convention.

The Mining Bill in Congress.

Those in charge of the mining debris bill, as it is called, at Washington, are more than hopeful of its passage this session, and a day will be set for its consideration, in all probability.

The main difficulty in the way now is the opposition shown by Congressman Geary of this State, a man, too, pledged to support the measure, and elected from a mining region. He introduced a bill of his own, local in its nature, and always did object to the Caminetti bill, which is broader and more general in its provisions. The miners' delegates have had hard work with Mr. Geary, and now he comes out openly in opposition, because Caminetti opposed some harbor measure of his.

The State Miners' Association and the County Miners' Associations have adopted resolutions adverse to Mr. Geary's course, and calling upon him to support this California measure, to which he stood pledged. He declares he does not desire reelection, so feels independent in the matter. It is much to be regretted that this man puts his personal opinion in opposition to the desires of his constituents; in a measure, too, of such great importance. His attitude is inimical to the best interests of the State he is supposed to represent. Opposition was, of course, expected, but not from a man from the mining districts. The miners here are highly indignant, but if they will send small men to Congress, they must expect small actions.

Aside from this action of Geary's the news from Washington is encouraging. Mr. Luttrell is still there in the interest of the miners. Mr. Hobson will be back here this week. Judge Searles has left Washington, but has not returned home.

A Stupendous Column of Water.

Altogether the most extraordinary water power installation—so far as head is concerned—ever known has recently been made by the Pelton Water Wheel Co. in one of the famous Comstock mines at Virginia City, Nev. The wheel is 36 inches diameter made of a solid steel disc with the buckets riveted on to the periphery in a way to afford absolute security, weighing complete 180 pounds.

It is running under a vertical head of 2100 feet, equal to 911 pounds pressure. Four hundred and sixty feet of this head is obtained from the pipe line of the Gold Hill Water Co., and the remaining 1640 feet from the California & Con. Virginia shaft, down which the pipe line is run to the Suto tunnel level where the wheel is located, and through which the water discharges after passing over the wheel. The wheel runs at 1150 revolutions, with a peripheral speed of 10,804 feet per minute, or about 120 miles per hour.

The construction of the wheel amply provides for the centrifugal strain the velocity of the water gives it, running without load, when it would attain the enormous speed of 21,608 feet per minute, equal to about 240 miles per hour. A nozzle tip one-half inch diameter gives under above conditions 100 horse power. Every miner's inch of water—equal to a flow of 1.6 cubic feet per minute—gives five horse power, while one horse power is given for every two pounds of metal in the wheel. It is only by comparison that an idea can be obtained of the height of a column of water due to such pressure. It is more than four times as high as the Washington monument, and considerably more than twice the height of the Eiffel tower. It is safe to say that no water wheel has ever before been operated under any such head nor any such demonstration afforded of the velocity and power of water under such an extreme pressure.

The installation made by the Pelton Company some two years ago in the Chollar shaft, on the Comstock lode, is in some respects no less extraordinary. This consisted of six 40-inch Pelton wheels, which

run under a vertical head of 1680 feet, driving that number of electrical generators, the power from which is conveyed up the shaft to the Nevada mill, some 2000 feet distant. These wheels only weigh 220 pounds each, and with nozzle tips five-eighths of an inch diameter develop 125 horse power each.

The water is first run over a Pelton wheel on the surface under 460 feet head, and is then carried down the shaft by a pipe to the Suto tunnel level, where the underground station is located, the power from the electrical generators being conveyed to the counter shaft of the mill with which the surface wheel is connected, the two distinct forces working together in perfect harmony.

A most interesting feature of the double use of water is here illustrated, some 400 horse power being produced in this way from what may be termed waste water. This station has now been running more than two years without interruption, and practically without expense in the way of repairs, affording a most striking example of the advantages of water power both by direct application and electric transmission, as well as the reliability of such a plant under such extraordinary conditions.

American Society of Mechanical Engineers.



The members of the American Society of Mechanical Engineers who make the California trip will be in this city on Monday, and will be suitably entertained by their professional brethren.

On Friday morning, May 13th, the party will be met as they cross the Sierra Nevada mountains, on entering California, by a committee of ladies and gentlemen going from San Francisco and Sacramento, under the guidance of Mr. H. J. Small of Sacramento. Mr. Small will have carriages in waiting to convey the party to the railroad shops, Capitol, Crocker Art Gallery, and other points of interest. Leaving Sacramento, they will be accompanied on their way to Monterey by an escort of ladies and gentlemen in a special car, who will render all the assistance possible in making their journey pleasant. On their arrival and during their stay at Monterey, the party will be in charge of Mr. E. J. Molera, vice-President of the Academy of Sciences, who will act as chairman of a special committee to entertain them by drives and other means.

Monday, May 16th, at 10:30 A. M., the party will arrive in San Francisco, where they will be met at the Palace hotel by the Citizens' Committee, as per program, the time to be set hereafter.

During their stay here, there will be a trip around the bay in Spreckel's new tug, the "Fearless," through the Golden Gate, and up Mare Island Straits to the Navy Yard, there to disembark and visit the shops and dock; then to return to the tug, where a lunch will be served on the way back to the city. The greater part of the day and an early start will be required for trip.

There will also be a trip to Pillarcitos dam, under the auspices of Mr. Chas. Webb Howard and Mr. Herman Schussler of the Spring Valley Water Co. A train will be furnished at Fourth and Townsend for San Mateo. The party will be met by carriages and a visit made to the dam, and a collation served at the grounds. The whole day will be required.

There will also be a trip to the Cliff House and Suto Heights, the residence of Mr. Adolph Suto. There will be a trip also to the Union Iron Works and Pacific Rolling Mills, where the ship yards, the

Government vessels, hydraulic docks, etc., will be inspected. The tug will convey the party from the foot of Market St. to the works and return. The Risdon and Fulton Iron Works, the Pelton Water Wheel Co. and other works will be visited under the escort of a proper committee. Visits will be made to all the cable-road power houses and the electric roads of the city. On this trip, Mr. A. S. Hallidie, father of the cable railway system, has kindly consented to take charge of the party. Guides will be appointed and proper time selected for these trips to suit the convenience of those desiring to visit these places.

An exhibition of machinery and mechanical appliances used on the Pacific Coast will be given by means of lantern slides at the Academy of Science Hall, on such an evening as may be selected by the guests; and other trips and entertainments for both the engineers and their ladies will be arranged for as soon as it is known what amount of time the visiting party can accord us. This program is subject to revision to suit the convenience of the guests.

The local committee has provided a very pretty souvenir badge for the ladies of the visiting party. It is in the shape of a spoon fashioned like a miner's shovel and made of silver. It is arranged with a clasp to be worn as a pin. On the face of the shovel blade are the words "San Francisco," and on the reverse, "A. S. M. E., May 16, 1892." The handle of the shovel is ornamented by a small silvery grizzly bear.

It is to be hoped that the mechanical engineers of this city, whether members of the society or not, will take a personal interest in the entertainment of these gentlemen and ladies, and give the local committee all the aid they can. The sessions of the society will be held at the Academy of Sciences Hall, Market street, near Fourth, at hours to be announced in the daily press.

The party, which left New York on May 4th, was composed of the following, although others probably joined at other cities on the way:

Wm. H. Wiley (Treas. of the Society), New York; Prof. F. R. Hutton, Secretary, A. S. M. E.; John T. Byrd, Gen. Mgr. Stearns Mfg. Co., 233 West Seventh St., Erie, Pa.; F. H. Lafarge, Chief Insp. Conn. Mut. S. B. Waterbury, Conn.; Thos. J. Borden, Pres. Richard Borden Mfg. Co., Fall River, Mass.; Thos. Hibbard, M. E. and Treas., Geo. Lawley & Son, South Boston, Mass.; Wm. F. Monaghan, 169 E. 60th St., New York; F. M. Power; W. B. Cogswell (Manager 1890-92), Gen. Mgr. Solvay Process Co., Syracuse, N. Y.; Washington Jones (Vice-Pres. of the Society in 1891-92), Philadelphia, Pa.; Wm. C. Williamson, Williamson Bros. E. & B. Works, Philadelphia, Pa.; J. D. Williamson; R. W. Hunt (Pres. of the Society in 1890-91), Cons. Eng'g, Chicago, Ill.; H. O. Francis, Pres. Steam Eng'g Co., Philadelphia, Pa.; Addison Hutton; Alfred Betts, Pres. Betts Machine Co., Wilmington, Del.; Edw. Andrews; D. G. Moore, Vice-Pres. S. L. Moore & Sons Co., Elizabeth, N. J.; Prof. D. S. Jacobus, Asst. Prof. Experimental Ship Work, Stevens Inst., Hoboken, N. J.; Fred. H. Daniels, Washburn & Moen Mfg. Co., Worcester, Mass.; C. W. Hunt, No. 46 Broadway, New York; Joel Sharp (Vice-Pres. of the Society in 1889-91), Pres. Buckeye Engines Co., Salem, O.; Chas. M. Trump, Mech. Eng. The Solvay Process Co., Syracuse, N. Y.; Vincent G. Hazzard, draughtsman with The Pusey & Jones Co., Wilmington, Del.; Jas. McBride, Supt. N. Y. Dyewood Extract and Chemical Co., Brooklyn, N. Y.; Albert Stearns, Supt. Church, & Co. Chemical Works, Brooklyn, N. Y.; D. Ashworth, Mech. & Cons. Eng., Pittsburgh, Pa.; S. T. Wellman, Pres. Wellman S. & L. Co., Cleveland, Ohio; W. S. Wellman; Edward H. Parks, Mech. Eng. Brown & Sharp Mfg. Co., Providence, R. I.; Fred'k A. Schussler, Supt. Brush Elect. Co., Cleveland, Ohio; F. Martins, India Rubber Comh Co., L. I., New York; W. E. Schoenhart; Harry S. Haskins; M. P. Higgins, Supt. Washburn Mech. Shop, West St., Worcester, Mass.; Geo. I. Alden, Prof. Mechanical Eng'g Polyt. Inst., Worcester, Mass.; John Knickerbocker, Pres. Eddy Valve Co., Watford, Troy, N. Y.; Walter G. Cotton; Geo. H. Smith, Beam & Smith, Providence, R. I.

Messrs. Wiley, Wm. C. and J. D. Williamson, Hunt, Betts, Andrews, Moore, Daniels, C. W. Hunt, Sharp, Trump, Hazzard, McBride, Ashworth, Wellman, Parks, Haskins, Higgins and Smith are accompanied by their wives. In addition to these, there are in the party the following ladies: Sarah K. Wiley, Helen Wiley, Mahel Cogswell, Mrs. Mary W. Bringham, Mrs. H. B. Winehoener, Mrs. A. K. Mansfield, Mrs. H. G. Hammitt, G. L. Hammitt, F. S. Hammitt, and Gertrude L. Stearns.

THE mining outlook around Colfax is good. The Rising Sun company has already started to work and about the first of next month the Big Oak mine will be started.

Heretical Geology.

BENICIA, CAL., May 7, 1892.

TO THE EDITOR:—Geologists assume that in the formation of the earth's crust, as they term it, all strata were originally laid down in a horizontal position. An accidental circumstance caused me to make this subject a special study. From my own observation I became convinced that the assumption which I have specified was a fallacy. In order to show the importance of this assumed prin-

the strata shows that such a thing could not possibly have occurred in this instance. The entire body of gravel in which the excavation has been made, unquestionably remains precisely as it was originally deposited by the action of the water.

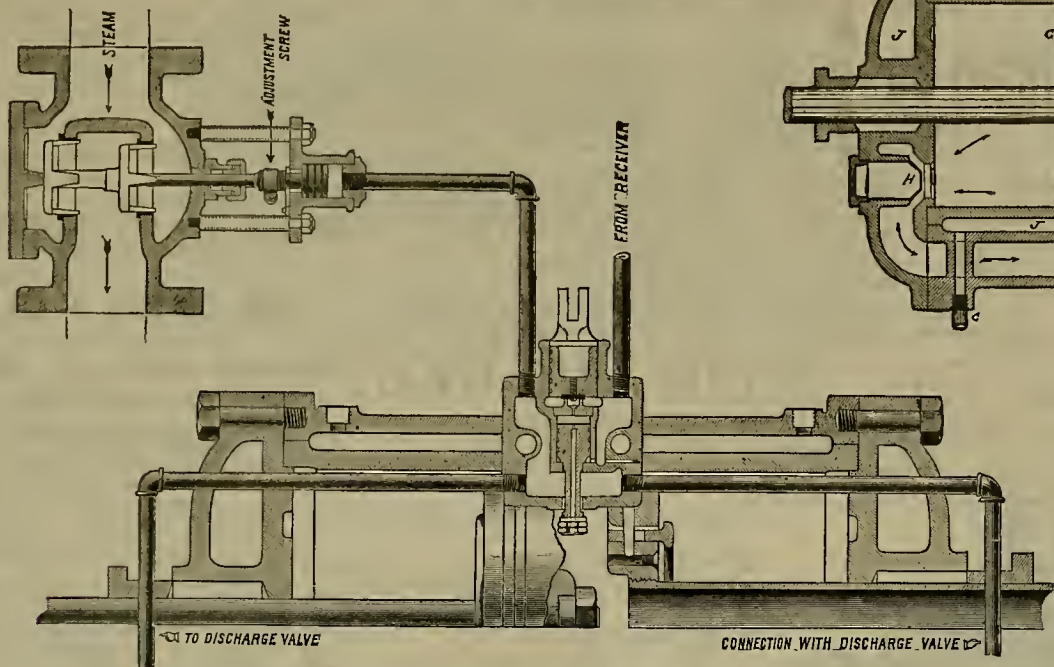
It may be contended that the example which is here illustrated is on a scale too small to make a just comparison with such instances as have governed geologists in their conclusions. The governing principle is the same, whether a stratum found in the

ment as this, it is sufficient to cite the fact that the Ptolemaic system of astronomy was orthodox science for a thousand years, and even after Galileo, by the use of the newly invented telescope and by mathematical demonstration, had shown the absolute falsity of the principle or theory on which

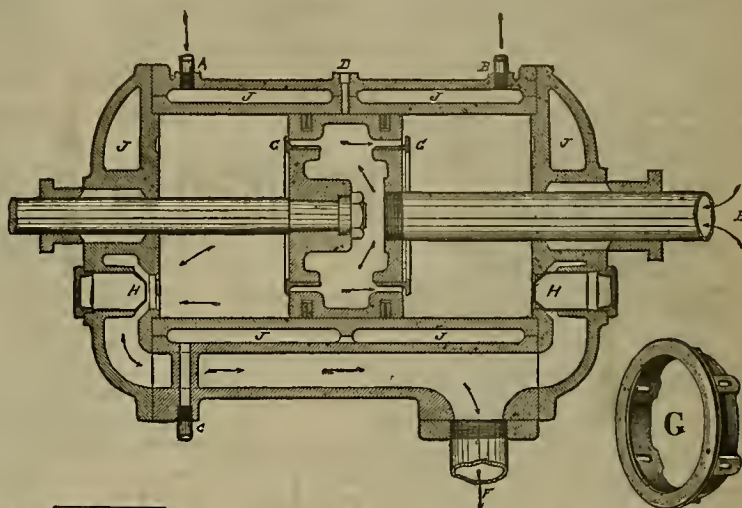
Ingersoll-Sargeant Cold-Air Compressor.

(Continued from page 351.)

The air inlet pipe which extends through the cylinder-head serves as a bearing and support for the piston, thus insuring the minimum wear in the air cylinder, and a



AUTOMATIC AND ADJUSTABLE REGULATOR AND UNLOADING DEVICE.



SARGEANT'S CONCENTRATED PISTON INLET COLD AIR CYLINDER.

perfect uniformity of such wear as must take place in every engine. Another cut shows the unloading device and regulator, as applied to the Ingersoll-Sargeant air compressor. The purpose of this unloading device is to maintain a uniform air pressure in the receiver and a uniform speed of engine, notwithstanding the consumption of the air, and to do this without waste of power or attention on the part of the engineer. A weighted valve of safety valve pattern is attached to the air cylinder, and is connected with the air receiver, and with a discharge valve on each end of the air cylinder, also

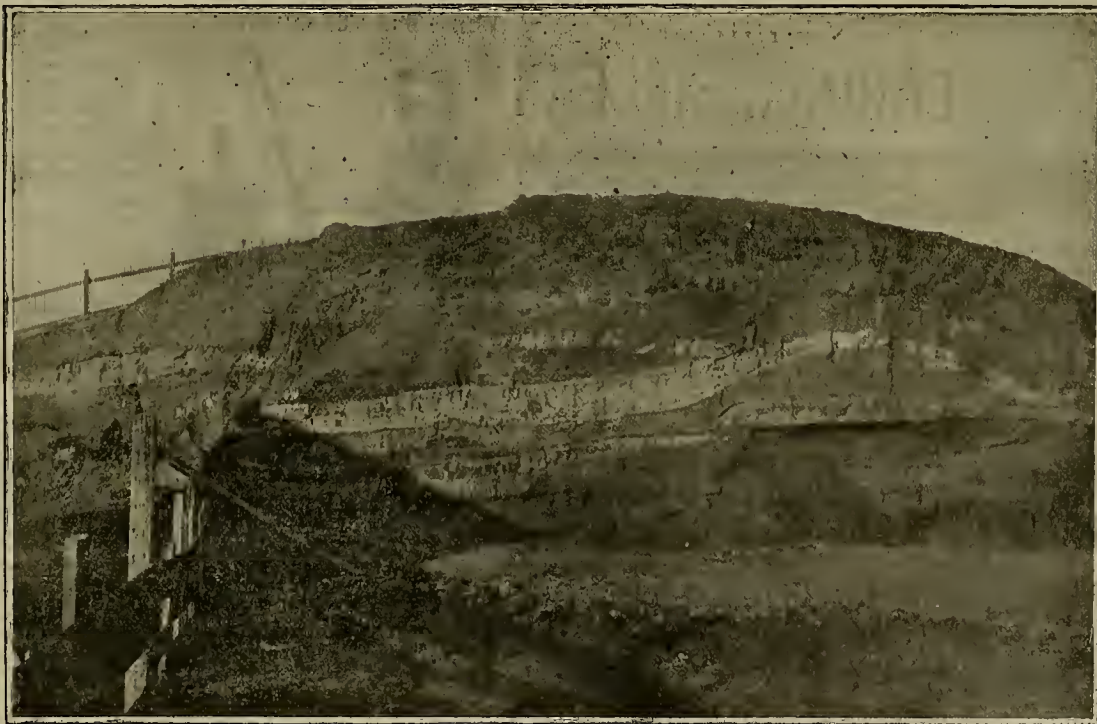
with a balanced throttle valve in the steam pipe. When the pressure of the air gets above the desired point in the receiver, the valve is lifted and the air is exhausted from behind the discharge valves, thus letting the compressed air, at full receiver pressure, into the cylinder at both ends, and balancing the engine. At the same instant, the compressed air is exhausted from the little piston connected with the balanced steam valve and the steam is automatically throttled, so that only enough steam is admitted to keep the engine turning around, or to overcome the friction, no work being done. When the compressor is unloaded, it is evident that the function of the air piston is merely to force the compressed air through the discharge valves and passages from one end to the other until more compressed air is required, this being indicated by a fall in the receiver pressure. The weighted valve now closes and the small connecting pipes are instantly filled with compressed air; the steam valve automatically opens and the compression goes on in the regular way. Another function of this device is to prevent the compressor from stopping or getting on the centre. Direct-acting compressors are liable to centre when doing work at slow speed. The Parke & Lacy Co. of this city are sole agents on this coast.

ciple in the science of geology as it is now taught, I will quote verbatim from Le Conte's Elements of Geology. In chapter second of said work, which treats of stratification, beginning on page 17, he says: "The most important points connected with stratified rocks we will now, for the sake of greater clearness, bring out in the form of distinct propositions. On these propositions is based nearly the whole of geological reasoning. First, stratified rocks are more or less consolidated sediments. . . . Second, stratified rocks have been gradually deposited. . . . Third, stratified rocks were originally nearly horizontal."

There is shown herewith a photographic engraving which gives irrefragable proof of the fallacy of the third and most important of the propositions just quoted. It is taken from the perpendicular face of an excavation being made in the town of Benicia. It is doubtless a deposit of the Drift period, contemporaneous with the plain gravel of this State. No portion of it has become so hard but that it may be easily removed by the use of the pick. It is composed chiefly of fine gravel and coarse sand, intersected by a stratum of pipe clay.

The engraving shows a stratum of pipe clay with one portion horizontal, while another portion of the same has a very considerable degree of curvature immediately over another stratum lying horizontal. If it appeared singly, a geologist would say that it had been bent into a curved form after being deposited; but the relative position of

manner illustrated by two feet in thickness, or two hundred, or two thousand, even; the difference of the quantitative result arising merely from the difference in the magnitude of the false system. I will mention a less con-



HORIZONTAL AND CURVED SARATA OF PIPE CLAY AT BENICIA.

of the producing forces. The theory that all strata was originally deposited horizontally, and that whenever it now appears in a different relation it is the result of subsequent disruption or distortion and displacement, forms the basis of the science of geology as now taught. It is a false basis.

I apprehend that it will be urged against my position that it is hardly possible that a large number of wise men would devote their lives to the study and teaching of such a science as geology without discerning the falsity of the principle or theory on which it is founded. In answer to such an argu-

spicious instance of the present time, wherein it will be shown what great mistakes learned men may make in their conclusions. Charles Darwin, one of the most famous scientists of the nineteenth century, prepared and published a treatise on the earthworm, wherein he taught that it was a prime factor in the production of all the arable surface of the earth; when, as a matter of fact, the earthworm is one of the scavengers provided by infinite wisdom, which, like the common housefly, accompanies, but never precedes, civilization.

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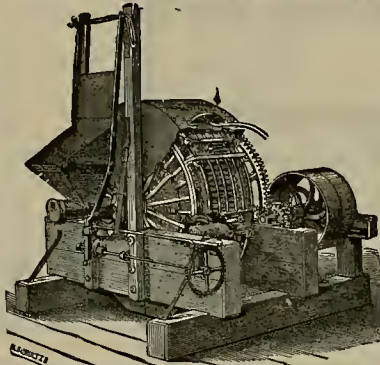
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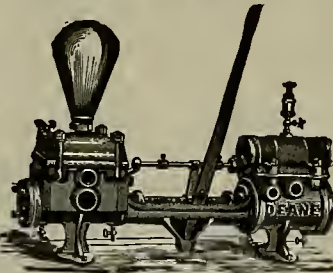
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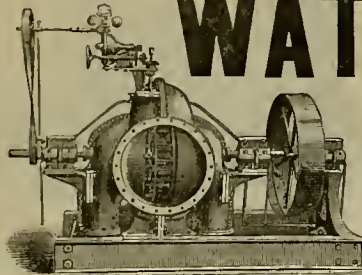
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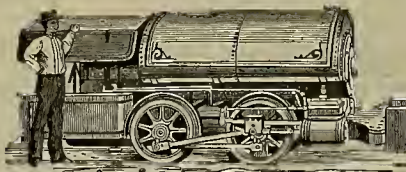
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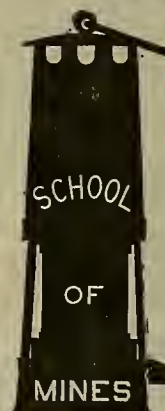
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 12, 1892.

Continued cool weather has prevailed the past week. Moderately warm weather and clear skies are now wanted for growing crops, for the ground is well saturated and vegetation can do without rain from now on, provided the large growing sections of the State are not visited by north winds. The improved condition of the wheat crop has caused an advance in outward wheat charters. If the advance is sustained it will be the means of sending more vessels to this port with coal, iron and coke. General trade is said to be fair. The local money market is reported unchanged, as are the Eastern money markets.

SILVER.—The offering of bullion to the mint is larger than it was at any time last month. This causes some surprise, in view of a strong probability of more favorable action by Congress on the Free Coinage bill. All advices received from Washington, D. C., are confirmatory of some kind of compromise or combination by which a bill will be passed which will be more favorable than the one now in force. The action of England in accepting a bimetallic international conference is accepted as a long stride toward securing a general international bimetallic agreement. At the last conference, England's open hostility to bimetalism defeated an international agreement on the subject, but public opinion in that country appears to have since then undergone a radical change, for there is a growing demand for bimetalism. The fluctuating value of silver, on which fully one-half of the world's trade is based, has undetermined general trade and exchanges and has made everything unstable. Instead, as formerly, bearing the stamp of legitimate transactions. Besides this, by lowering the price of silver the purchasing power of countries using silver is greatly lessened, and consequently they are not as large importers of the products of gold countries as they were when silver was on a more even footing with gold. The low price of silver has enabled India to successfully compete in the markets of the world with many of her manufactured goods, cotton, etc., which builds that country up at the expense of the like industries in England and also in this country. A well known authority at the East on financial subjects says that at the beginning of 1872 silver stood at a premium of three cents above gold. Since then the course of silver, wheat and cotton were downward most of the time until the passage of the act of 1890, directing the purchase by the Government of 54,000,000 ounces of silver, and the issue of that amount of lawful paper money to pay for it each year. The passage of that act soon raised the price of silver from \$1 to \$1.21 per ounce; wheat from 85 cents to \$1.09 per bushel; cotton from 10 1/2 to 12 1/2 cents per pound, and thereby gave life to all legitimate business. To defeat these results, England issued paper rupees, redeemable in silver, and paid them out to buy wheat and cotton in India, and through such temporary expedients has succeeded in again putting down prices for silver and cotton, as she would the price of wheat had it not been for short grain crops in Europe and the present grain famine in Russia. The expedients, however, may yet prove very expensive, for if these results in her efforts at bringing about the repeal of the act of 1890 or prevent free coinage by this country, she must soon enter the markets of the world and buy silver to redeem her outstanding silver obligations.

MEXICAN DOLLARS.—Shipments the past week aggregate 64,502 dollars to Hong Kong and 89,000 to Japan. The latter country also took \$107,800 in silver bullion. The market for Mexicans is fairly steady.

QUICKSILVER.—Receipts the past week aggregate 44 1/2 flasks. The market is fairly steady.

LIME.—Receipts the past week aggregate 2405 bbls. The demand is fair for both home and export.

BORAX.—Receipts the past week aggregate 1080 cbs. The market is fairly firm with a continued free Eastern demand ruling.

LEAD.—The market is easier. Eastern advices report a weaker tone notwithstanding light stocks. Buyers are pursuing a conservative tone, and only place a good sized order when offered concessions. **TIN.**—Tin plate is going into consumption more fully. Canners think they will use more than they had expected. Pig is strong on this coast, at the East and abroad. The statistical position is strong. In April English spotstocks fell off 13 1/2 tons, or to an exceptionally low point, while there was a falling off of 37 1/2 tons in the quantity afloat for that quarter. On the other hand, American spot stocks are shown to have increased 850 tons and the quantity afloat for this country to have increased 135 tons. Looking at the returns from another point of view, it would appear that the bulk of supply is gradually being transferred from the English to the American market, although doubtless under former control. Thus the American visible supply has increased 535 tons, while the English visible has fallen off 1507 tons, in which changes the shipments of 1400 tons hence from England are a prominent item.

COPPER.—The market is firmer, with an upward tendency reported. *Iron Age*, May 8th, reports the New York market as follows: "Spot parcels of Lake Superior ingot are very difficult to obtain at less than 12 1/2 c, while near future shipments may be secured at 12c, and wire bars are held at a similar premium, say 12 1/2 c for prompt, against 12 1/2 c for future deliveries. Rumor goes so far as to state that available supplies of copper for export are insufficient to meet the demand, and that foreign consumers are actually discommoded for want of material."

IRON.—The market is steady, with no marked selling pressure reported. The consumption is large, but foundrymen's near by wants are said to be supplied. At the East the market does not show any material change. The consumption and production alike are large.

COAL.—Receipts the past week aggregate as follows: Comox 1500, Departure Bay 1000, Coos Bay 500, Seattle 2470, Tacoma 2160, Newcastle N. S. W. 2485; total 10,115 tons. The market is weak for household but firmer for gas and steam. Canneries starting up have enlarged the demand. Higher wheat charters at this port will probably attract more vessels to this coast. An explosion in the Roslyn mine, Washington, will curtail the output from that source, but with any appreciation in prices the output of the mines would be largely increased.

Mining Share Market.

SAN FRANCISCO, May 12, 1892.

Mining shares the past week surprised the street by an erratic move in Ophir and Mexican. On Friday the market closed weak and dull, but at the first session on Saturday shares in the above two mines doubled in value. The up move was unexpected, and the decline which followed so rapid they did not allow many outsiders to take advantage of the jump by selling. Other shares moved up and then down in sympathy from 5 to 25 per cent. There was nothing new from the mines further than had been published by the Press, to indicate the sudden jump, consequently it is only surmised as to the cause. The move so as to frighten outsiders from playing at the ring's game of selling short. Shrewd operators do not short now until there is a sudden jump, and then they put shares out only to be bought back on the decline which invariably follows. Among the very best informed there prevails a strong belief that the milling and stockpools are working the market

upward, so as to again get the public stock on "hype" at each set back for an up-turn. It is these purchases on a set back that allow insiders to get the best of outsiders and admit of their being able, after confidence is somewhat restored, to break the share market quick and to such low figures as not only to uncover shares on a margin but also get cash shares at low prices; but falling in this, levy assessments and keep shorting the market until outsiders are worn out and sell in disgust. Of course their dummy directors help them in the legal robbery by having all favorable news from the mines suppressed and only porphyry, water strikes and similar discouraging news officially reported.

The Mining Stock Association appears to have played into the hands of mine managers, when the Association turned the control of Savage over to J. L. Flood. Evidently, they were deceived into this by the Flood management of Hale & Norcross giving weekly reports from the mines, which conform to the law under which the companies incorporated. Perhaps it was the Brokers' Combine that forced the Hale & Norcross management to conform to the law, and not a change of heart on the part of the Flood combination.

There is a growing conviction among close observers of the work being done in the mines and also in the way in which the share market is manipulated, that the rings do not want moneyed men to enter the market as buyers at present, and everything that can be done is being done to keep them out. Of course, this does not apply to habitual traders, for the latter can be used by cappers and pointers. It is those who buy for investment they do not want in at present low prices. Whether the above views are correct, readers must be their own judges.

A. K. P. Harmon, 1st vice-president of the Hale & Norcross Mining Co., is president of Con. Imperial Mining Co., and yet in the month of April the net returns from the bullion extracted from the ore milled not only paid all mine expenses, but left a net balance of about \$150.

Do not the officials of the mines, of which the superintendents are also superintendents of the mill at which the ore is milled, know that they make themselves liable to criminal prosecution?

Is it not about time that the Mining Stock Association pay attention to the way in which the Gold Hill mines are managed? It is no secret that the mine managers say they are above the law, and that no power can reach them, and therefore mine-looting will not be given up.

The Brokers' Combine will contest for the control of Crown Point at the annual election to be held on June 6th. It will undoubtedly force the mill ring to enter the market as buyers, and when this is done, the outsiders will be able to sell out and buy back cheaper or at least this has been the case in all past contested elections.

The *Dayton Times* says that there are rumors afloat "to the effect that a mill may possibly be built at Sutro and the ore taken out through the tunnel. This method of extraction and transportation would be much cheaper than any other, and in a short time would save the price of the construction of a mill. Such a move would no doubt lead to other mines than the Con. Virginia shipping ore through the tunnel, and in time a number of mills might be at work at this place and Sutro."

It is now an open secret that one of the mill rings on the Comstock has bought the MacArthur Forrest process for the reduction of refractory and low-grade ore. By this process 95 per cent of the assay value of the ore can be saved. It is said that tanks for leaching purposes are being built.

The Hale & Norcross Mining Co. has moved into the office lately occupied by the Quijotoa mining companies. Before going into the new quarters, the rooms had to be purified, painted and made somewhat respectable.

Captain Voll, the veteran of Pine street, is again in the stock market. With his advent more life and livelier turns are the order.

The share market this morning was strong, with the middle stocks scoring a slight advance.

The Silver King Mining Co. has received returns from 9627 pounds of ore sent to the El Paso Smelting Co. The mill will soon be in running order, when it will start up on a large quantity of ore on the dump.

Advices from the Comstock mines report that active developing or prospecting work is being done in the Kenosha tunnel. The work in Mexican and Ophir is being closely watched. If the stock market gets into better position for handling, good news can be looked for from Mexican, Ophir and Con. Virginia. Several of the Nevada Middle mines is kept back; perhaps insiders do not wish the public to buy the shares for fear the present favorable conditions may not hold out. An assessment, it is said, has to be levied by Overman, one by Confidence, one by Challenge, one by Con. Imperial and one by Belcher, before the managers of these mines will be able to do much toward creating higher prices for the shares in the Gold Hill mines.

Eastern Metal Markets.

New York, May 12.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper	Lead	Tin
Thursday.....	39 11-16	86 3/4	11 95	4 25	20 45
Friday.....	39 11-16	86 3/4	11 95	4 25	20 45
Saturday.....	39 11-16	86 3/4	11 95	4 25	20 45
Monday.....	39 15-16	87 1/4	11 95	4 25	20 45
Tuesday.....	39 13-16	87 1/4	11 95	4 22 1/2	20 55
Wednesday.....	39 11-16	87 1/4	11 95	4 22 1/2	20 65

Quicksilver is firm. Borax is in good demand at full prices. Copper appears to have a stronger tone. Pig tin is strong at an advance. Lead is weak.

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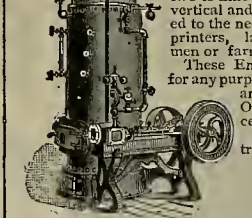
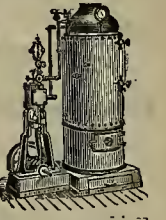
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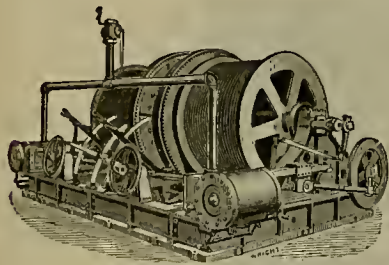
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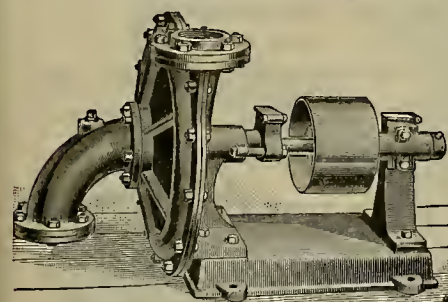
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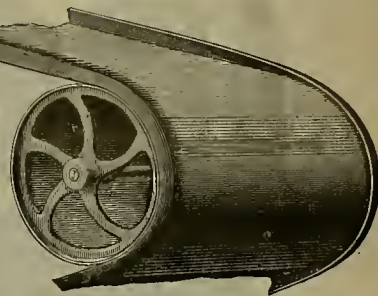


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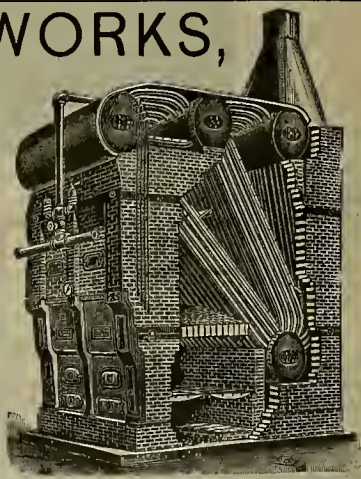
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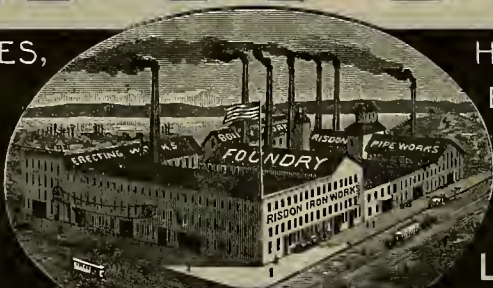
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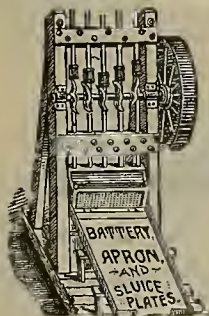
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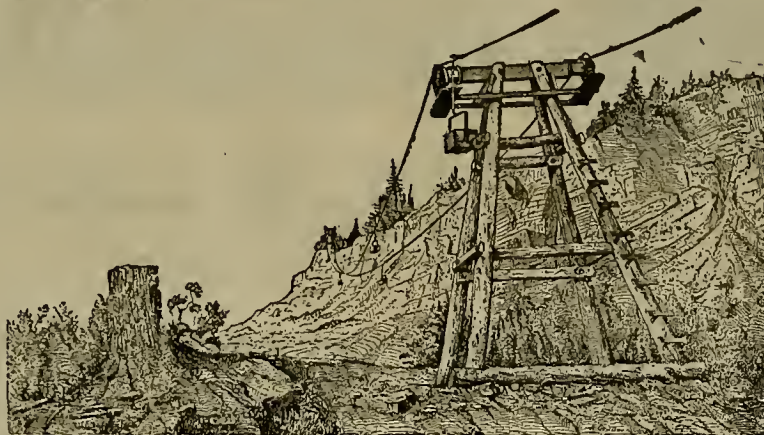
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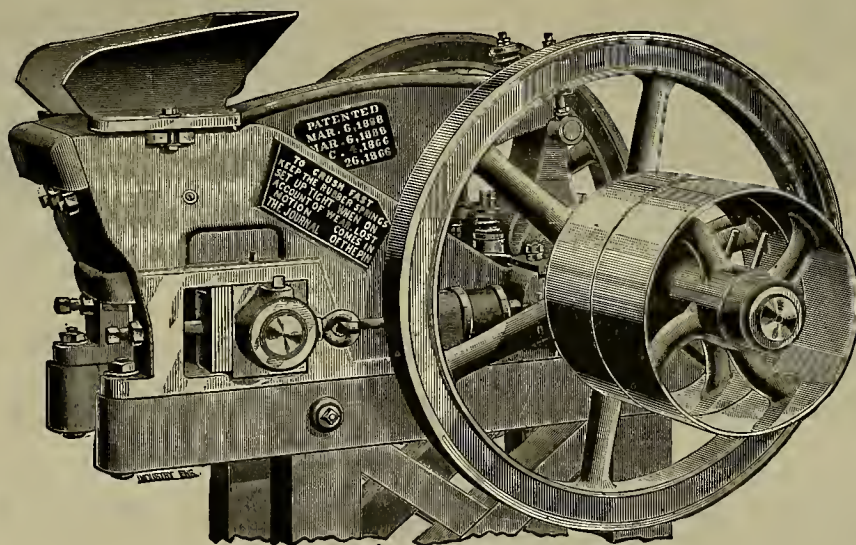
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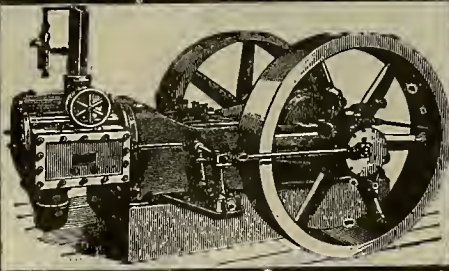
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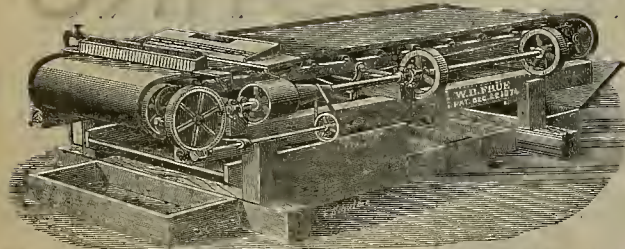
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I am, my Dear Sirs, Yours faithfully,
S. HARRIS, Manager.

For any information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.

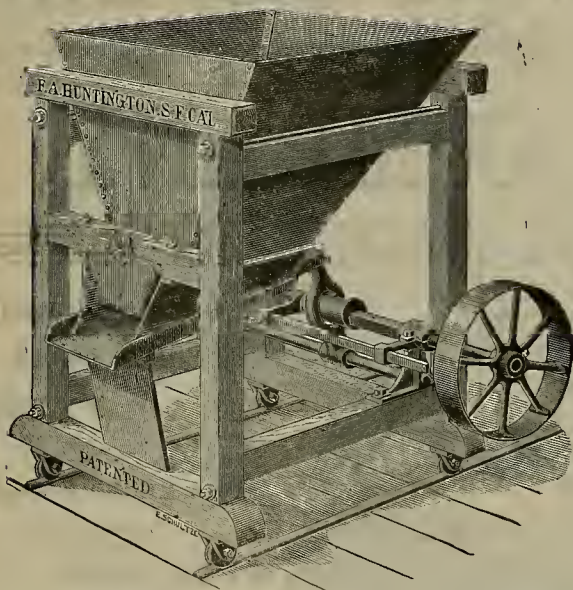
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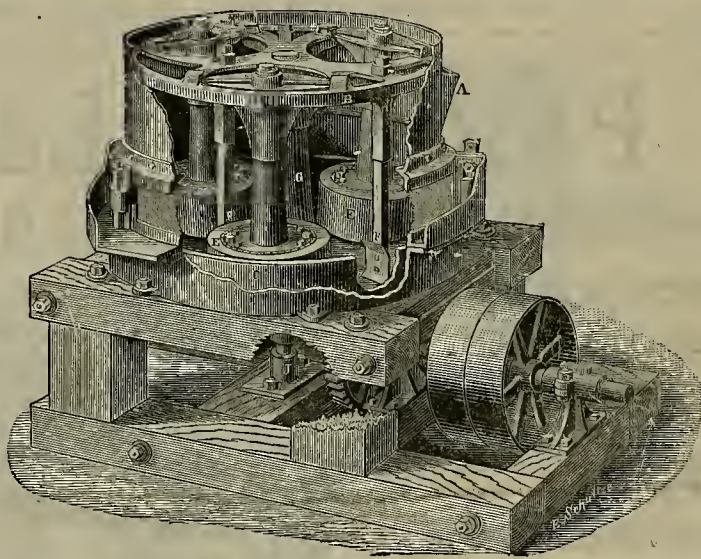
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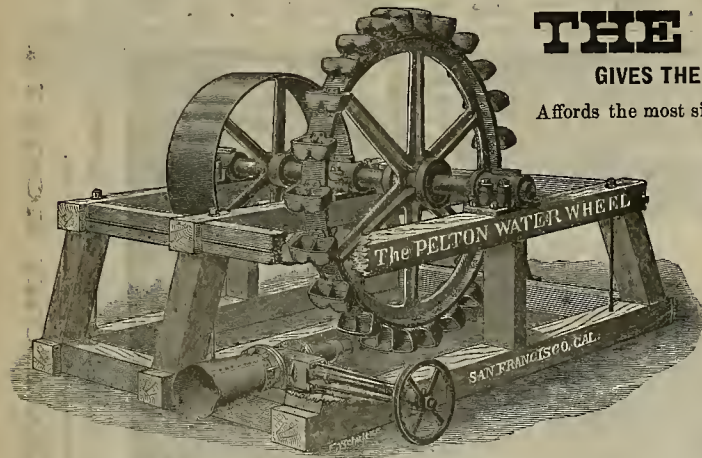
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UNLIMITED IN CAPACITY. UNEQUALED IN EFFICIENCY, UPWARD OF 3,000 NOW IN USE. Will do more than twice the work of any other with the same cost in wear. Give a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

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THE PELTON WATER WHEEL CO. 121-123 Main Street San Francisco, General Western Agents.

MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL LXIV. — Number 21.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, MAY 21, 1892.

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SINGLE COPIES, 10 CENTS.

The Sergeant Rock Drill.

The Sergeant auxiliary valve drill is, strictly speaking, a drill for hard rock. It embraces the independent valve operated through an auxiliary valve, and which contains a release rotation. These two features are the most important as distinguishing the Sergeant from other rock drills. The Sergeant, like the Ingersoll, strikes an uncushioned blow. The valve is held in such a position that while the piston carrying the cutting tool is moved toward the rock the exhaust remains open on one end, while the full pressure acts on the other end until the blow is struck, at which time the valve immediately reverses. There is no such thing in the Sergeant as striking a blow upon a cushion of steam or air in front end of cylinder. It must hit the rock and does it before the steam or air enters the front end. It does not use steam or air expansively, but has the benefit of full pressure to strike the blow and to recover from broken or crooked holes.

The Sergeant has an auxiliary valve operated by shoulders upon the piston. The auxiliary valve and its valve seat are entirely independent of the main valve and seat. The auxiliary is the trigger to the main valve. It opens or closes the steam or air passages, releasing the pressure from one end or the other of the main valve. The pressure bears it upon its seat; hence its wear is uniform and cannot produce leakage. The auxiliary valve being light, of steel, and moving on the arc of a circle through contact with the piston operating tangentially, it is easily moved, does not wear rapidly, and never breaks. It is inexpensive and readily duplicated.

Using a round piston, made of steel and hardened, fitting plug-like in the ends, a large opening is effected by a slight movement of the valve. Being perfectly balanced, there is little or no wear.

A short or long stroke can be obtained at will by turning the crank and feeding the cylinder toward the rock. This is a most important feature, and is applied to the In-

gersoll and Sergeant drills only. A short stroke is of great advantage in starting or blocking out holes.

A new rotating device with a release

ing the friction of the back head springs, when with a rigid rotation it might twist the rifle bar or break the pawls and ratchets.

Two strong steel springs are used in place

The Outlook for the Hydraulic Miners.

Mr. Luttrell, of the Hydraulic Miners' Delegation, sent to Washington to solicit from Congress aid in behalf of that interest, and who still remains at his post, the other delegates having left, still entertains the hope that Congress will vote the appropriation asked for, and recommended by the Committee on Mining. Should the sum so favorably reported be cut down, that gentleman believes that enough money will yet be given to warrant commencing the construction of the larger retaining dams projected. Once begun, it is thought that Congress will later on appropriate sufficient money to continue the work and carry it to completion. There is, therefore, a good prospect that this important industry will in due time be revived, to the great benefit of both the farmers and the miners and the general advantage of the country at large.

Per contra, Mr. Geo. Ohleyer, of the Sutter County Farmer, while he believes the bill providing for the improvement of rivers and harbors will pass Congress, thinks the prospects for the hydraulic bill are doubtful, going on to remark that if this sort of legislation is going to be entertained by Congress, it will, in his opinion, cause to be made such a searching examination of this debris question as cannot fail to result disastrously to the cause of the hydraulic miners. We had hoped there had come an end to these unfriendly insinuations and covert attacks upon an industry which, through the efforts of its friends and the partial relenting opposition of its foes, was staggering into life again. Not certainly during this season of truce did we expect to see this industry, so feebly

gasping for life, assailed with so much of acrimony as these givings out of Mr. Ohleyer would seem to imply. But then, something must be pardoned because of the malaria and the general discomforts of the Slough City; besides, our estimable friend George is naturally crabbed and pugnacious.



THE SERGEANT DRILL—WORKING CLOSE TO A WALL.

movement prevents twisting of the spiral bar or breaking of pawls and ratchets. When a rock drill strikes a hard blow upon an uneven surface there is a tendency sometimes to twist the steel in the opposite direction to that in which it rotates. The effect of such a blow on the Sergeant drill is simply to turn the back head around, overcom-

ing the friction of the back head springs, when with a rigid rotation it might twist the rifle bar or break the pawls and ratchets. These machines are manufactured by the Ingersoll-Sergeant Drill Co. The Parke & Lacy Co. are agents.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Ed.

The Cyanide Process.

SAN FRANCISCO, May 7, 1892.

TO THE EDITOR:—The learned and scientific account of the cyanide treatment that appeared in your issue of April 23d does not give much assurance that we have at last discovered an infallible process for the reduction of ores, whether high or low grade. Six dollars a ton is considered high grade these days, when there is enough of it, and the average yield of all our greatest mines, such as the Sierra Buttes, Plymouth, Keystone, etc., has not much exceeded that figure, at least in free gold. Mining is an expense that must be met, whatever the process, and while the cost of milling in some of the above mines has been as low as 37½ cents, the total expenses, independent of reduction, have been rarely below \$3.50 or \$4, and this with thorough equipment, and on an extensive scale. Now we find in your valuable article the quantity of cyanide necessary to treat a ton of ore will vary from 1 to 1½ per cent, or at a cost of nearly \$2 to \$8 per ton, without regard to other incidentals. How could our mines, the vast majority of which produce ores under \$8 a ton, be benefited by a process so dear as this? Mining would continue to cost from \$2 to \$6 a ton, and the dullest dolt would surely not give \$2 to \$5 more to get his gold by cyanide when he could secure it by milling, which would not cost over 50 cents or \$1.

Silver ores run much higher, as a rule, than gold, but here the process seems to be utterly at fault, as the investigations show it did not reach over 60 per cent of that metal. If a silver ore consequently assayed 100 ounces, the loss per ton by cyanide would be 40 ounces, while by roasting, chloridizing and amalgamation, it could be worked at a cost of \$6 to \$10 up to 95 per cent. If cyanide could be demonstrated to reduce sulphurets, it would be an inestimable boon; yet even here it would not apply in all cases, as some sulphurets run very high in silver, and the loss in that metal would exceed many times over the cost of chlorination. Cyanide is likely to have its day in the hands of professional enthusiasts, and then be relegated to obscurity, or to the treatment of those \$10,000 ores in Shasta county that one of your recent correspondents wrote about. People are constituted differently, but in regard to ourselves, we can say, emphatically, if we had a mine containing \$10,000 ores, we do not think we would ever have need of any process at all.

"PIONEER."

Heretical Geology.

BENICIA, CAL., May 14, 1892.

TO THE EDITOR:—At the lower end of the cascades of the Columbia river, on the south side, about four miles below where the locks are being built, there lie exposed the ends of the trunks of several trees of the species known in the lumber market here as Oregon pine. The conglomerate in which they are imbedded is entirely below high water mark. It lies level, covered by hard massive rock left overhanging by the erosion of the conglomerate. The tree trunks project in a horizontal position, some of them being about four feet in diameter. The wood has been changed to hard black stone, but the bark on some of them is so completely preserved in its original condition as not to be readily distinguishable from that of fallen trunks of the same kind of timber lying on the mountain side above. At this point, without any intervening tableland, the mountain rises abruptly directly from the water's edge in a steep declivity to a height of about one mile. I challenge any geologist to explain logically the occurrence of those tree trunks at the place and in the condition which I have described in harmony with popular geological theories.

One of the cardinal tenets of the geologist is the unalterable immobility of the ocean's surface level. Geologists assert that there never has been, neither is it possible, that there ever could have been any great change in that. Although every explored portion of the earth's surface, even the highest mountains, give conclusive evidence that it has at some period been beneath the ocean's surface, geologists aver that it has always been the result of alternate depression and elevation, a seesawing (so to speak) of the land surface.

By popular geological theories, that portion of the earth's surface where those tree trunks now lie must in some previous period of the world's history have existed at nearly the same level, with the same climate as at the present time. Then a sinking began, and was continued until about a mile in thickness of mountain material had accumu-

lated in the depths of the ocean on the prostrate trunks of those pine trees. Then the motion is reversed and the land rises until the buried tree trunks have attained nearly about the same level as that at the time of their growth. Then the river is set to work until it cuts through the route of solid rock down to the level of the tree trunks, the entire process occupying an interval of time amounting to one or two millions of years, more or less. The geologist is never niggardly in the use of time in the construction of his theories, for he always has ready an unlimited supply from which he may draw without stint. In apportioning time though for different phenomena, there is liable to be clashing, as, for instance, in the case which stated climate must have remained the same for a very long period, while other phenomena in geological science as taught require that there should be continuous change.

The true solution of the appearance and condition of these tree trunks found in the position which I have described is to record them as one of the results of a deluge neither remote in time nor of long duration, and when men of science become obliged to admit, as they surely will eventually, not only the possibility of a deluge but the probability that one has occurred very nearly in the manner described in the book of Genesis, the science of geology will be placed on a true basis.

JUSTIN CHENOWETH.

How Miners Can Get Fresh Water.

Mr. George W. Durbrow, manager of the salt works at Salton, passed through here Sunday on his way home from Los Angeles. He ordered thirty carloads of lumber for the erection of a new mill and other buildings at Salton. Mr. Durbrow now has gathered around the salt works about one hundred Indians, and he is taking great interest in improving the condition of these aborigines. A mile or so from the village he has developed quite a quantity of water, and here he intends to establish the older Indians, and induce them to plant vegetables, melons, fruit trees, etc. The water is perfectly good for irrigation; but there is too much salt in it to render it palatable for drinking purposes. Mr. Durbrow intends putting in a condenser for the use of the Indians, and they can then have all the fresh water they want. He gave us the plan of a very simple condenser, and if prospectors and others who frequent the desert will read this description and provide themselves with the following apparatus, there will be no further complaint of the unwholesomeness of the water at Chuck-walla and other places. Take an ordinary five-gallon coal-oil can, and have a small, curved spout, about two inches long soldered on top of it; have about 20 feet of very small rubber hose. Slip one end of the hose over the spout of the can, and connect the other end with another can similarly fixed, only at a lower elevation than the first can. Let the middle of the hose rest in the pool of water. Now fill your first can with water and build a fire under it. The vapor will pass through the hose until it strikes the part that is submerged, when the cold will condense it, and it will flow into the second can in the shape of as pure and sweet water as one could wish. We hope we have made this plain. The whole outfit wouldn't cost more than a dollar or two. The condenser at the Indian village will be on the same principle, only an iron boiler, one-inch pipe and a wooden tank will be used.—Banning Herald.

A MILL AT SUTRO.—The Dayton Times says: Since the burning of the Eureka mill the ore from the Con. Virginia mine is being worked in the Morgan mill at Empire. This is a steam mill, and it has not the capacity that the Eureka had, and consequently cannot handle all the ore coming from the mine. Neither can the ore be worked as cheaply at the Morgan. These facts have caused rumors to the effect that a mill may possibly be built at Sutro and the ore taken out through the tunnel. This method of extraction and transportation would be much cheaper than any other, and in a short time would save the price of the construction of a mill. Such a move would no doubt lead to other mines than the Con. Virginia shipping ore through the tunnel, and in time a number of mills might be set at work at this place and Sutro.

THE ELECTRIC ROAD.—Officials of the San Francisco and San Mateo electric road state that an additional power house is soon to be built, but the location has not yet been decided upon. The company is now running 15 cars, but in a short time the number will be increased by five. The company has given orders for 30 more cars, to be completed as soon as possible.

Varieties and Uses of Mica.

George P. Merrill contributes to *Stone* some useful information on the varieties of mica.

There are several distinct varieties of mica all characterized alike by a very perfect basal cleavage whereby they split readily into thin sheets, but differing in color, elasticity and composition. The most prominent varieties are (1) the white colorless variety, muscovite; (2) the white to yellowish brown or brownish red variety, phlogopite; (3) the black and frequently opaque varieties, biotite and lepidomelane and (4) the pink lilac or rose colored lepidolite. Of these only the white variety muscovite is, excepting as a rock constituent, of economic importance, and need be described here.

OCCURRENCE.—The micas are among the most common and widely disseminated of minerals, occurring in irregular shreds or six-sided tablets in rocks of all kinds and of all ages. They are particularly characteristic of the acid crystalline rocks, both eruptive and metamorphic.

The white variety is, however, much the more restricted in its distribution, and it is believed is confined wholly to the older acid rocks of the granitic or gneissic groups.

The prevailing form of the micas is that of small irregular flecks, from a mere point to a fourth of an inch in diameter disseminated throughout the mass of a rock. In the younger eruptives, in limestones, and in granitic veins it not infrequently shows good crystallographic forms hexagonal in outline, which are easily recognized as mica from their property of splitting readily into six-sided thin sheets.

The white mica, or muscovite (sometimes called isinglass) of commerce is derived wholly from pegmatitic or other coarse granitic veins in granite and gneiss. Besides mica, the chief constituents of the veins are quartz and feldspar, though there not infrequently occurs a pleasing variety of mineral, as beryl, tourmaline, apatite, cassiterite, etc. Indeed such veins are the mineralogists' most fruitful fields, both as regards abundance and variety as well as perfection of crystalline form.

PROPERTIES.—The distinguishing characteristic of muscovite, and that which gives it its chief value, is its property of splitting readily into thin, transparent, tough and elastic sheets. It is but little acted on by heat, though gradually becoming brittle on prolonged exposure to high temperatures.

USES.—The chief use of mica is in the form of thin sheets for stoves and furnaces. For this purpose it must be clear and free from bad spots, cracks or blemishes of any kind. The most desirable color is stated to be wine red. Of late years there has arisen a considerable demand for mica in the form of strips some eight inches long by one inch wide for insulating purposes in the manufacture of electrical apparatus. The qualities essential for these purposes are toughness and freedom from iron. There is a considerable and increasing demand for ground mica, which allows of the utilization of the scraps which must otherwise go to waste. At present eight grades are prepared, the coarsest being used to give a spangled effect to fancy grades of wall paper, while the finest is used in producing a uniform metallic white surface on the same. The intermediate varieties are used mainly in the manufacture of lubricants for heavy machinery.

PREPARATION.—Mica occurs in sheets of all sizes up to two or more feet in diameter and from the fraction of one to several inches thick. The larger sheets are utilized mainly for sheet mica, and for this purpose the blocks, after being taken from the quarry, are freed from all gangue material, split to such thinness as to trim readily, and by aid of patterns cut to standard sizes, the value of the cut sheets increasing very rapidly in proportion to their size. There is a great amount of waste in this process, and it is stated not above eight or ten per cent of sheet mica is obtained from the block mica thus treated. The waste material or scrap from the trimming, and in some cases the entire product, if sufficiently clean and free from gritty substances, is ground. This process, owing to the toughness and fissility of the mineral, is one of considerable difficulty, and at date of writing not more than two or three firms in the entire country are prepared to do the work.

SOURCES.—More or less mica has from time to time been produced by nearly every State bordering along the Appalachians, though the mining is nearly always more or less spasmodic and intermittent. Frequently, mica forms a product of the feldspar and quartz mines, though the amount thus obtained is comparatively small. New Hampshire and North Carolina are at present

the chief sources in the United States. From 40 to 50 tons are annually produced, valued at from 10 cents to \$5 a pound, according to quality. The chief foreign sources of mica are Canada and India.

Shasta County Mines.

A meeting of the Shasta County Miner's Association was held in Judge Bell's office Saturday last.

A communication from the State Mineralogist was read, in which it was stated that Mr. Hobson had been compelled to remain in Washington for such a length of time that it was improbable that he could spare time to write a report on Shasta county for the next State report. The letter further stated that there were no funds to employ anyone else and that the report would necessarily contain old data. Mine owners and others are requested by the executive committee to send short description of work actually done during the last 12 months, to the secretary of the county association.

Mr. Swasey said he expected that the room in the Masonic building would be shortly ready for occupancy.

Some fine samples of ore and a number of subscriptions were handed in.

Some new and valuable books on mining have been received and others ordered.

The question of giving financial assistance toward the delegation expenses at Washington was again brought up and the meeting was of the opinion that it would take all our resources to establish the local association on a sound footing, and that all moneys on hand were only available for putting up the bureau and making it a thoroughly representative exhibition of the mineral resources of Shasta county.—Shasta Democrat, May 11.

Mining in Tonquin.

Lieutenant P. Balagny, an officer of the French army, is at the Lick. He is en route to Paris from Tonquin, where he has been stationed during the past six years.

He says the most important enterprise in Tonquin, which is under a French protectorate, is mining, and, although only recently considered of much importance, has been rapidly developed of late. The population is so great in proportion to the size and resources of the country that the people are usually poor. The development of the mining industry, however, will provide employment for many of the natives, whose labors have hitherto been expended entirely in the growth of rice and tea.

Coal is regularly shipped to Hong-Kong, and 18 antimony mines have been opened within the past year. The deposits of both minerals are rich and extensive. Silver and gold is also present in considerable quantities, but in locations so inaccessible that they cannot be readily mined.

The mines are operated for the most part by companies of English and French capitalists, whose headquarters are at Hong-Kong. Lieutenant Balagny says that there are splendid opportunities for the investment of capital in these mines, and that a number of Americans are going into the country.

THE BANNER MINE.—From Col. Frank McLaughlin it is learned that he has leased the famous old Banner mine for a term of two years, with the privilege of purchasing it during that time. That mine yielded in pioneer days about \$700,000 from surface diggings, and has never been even prospected to any depth. The Colonel now has a force of men, with L. H. Ayer as superintendent, cleaning out the shafts, and is preparing to sink several hundred feet, or as deep as is deemed necessary. The Colonel thinks that he will develop one of the best quartz mines in the State. If so, it will be a great boom for the mines in that locality. The telephone line from the Colonel's office to the mine was completed under the supervision of Jos. Marks.—Oroville Mercury.

ENTOMOLOGISTS.—The California Entomological Society has elected the following named as officers for the ensuing year: E. M. Ehrhorn, president; W. H. Robinson, vice-president; Alexander Craw, secretary; C. C. Riedy, treasurer; directors—E. M. Ehrhorn, W. H. Robinson, Alexander Craw, C. C. Riedy, Prof. C. W. Woodworth and Prof. C. H. Allen.

At the annual meeting of the Maryland Gold-Mining Company, held at Grass Valley, S. P. Dorsey, L. V. Dorsey, William W. Young, R. Shoemaker and Charles H. Mitchell were elected directors. The board was organized by electing S. P. Dorsey, president, and L. V. Dorsey, secretary and treasurer.

World's Fair Queries.

Answers to Questions Propounded at the Recent Convention.

Answers in brief to the questions submitted to the California World's Fair Commission by delegates to the convention which was held in this city on April 20th and 21st, have been made as follows: The State commission will pay railroad transportation from all terminal points in California on exhibits for the California building that are accepted by the commission. All shipments will be made at the risk of exhibitors. Exhibits will be returned to exhibitors free.—All works of art, if accepted, will be by classification only, and will be exhibited in the California building.—The proposed plan for the California building has practically, but not officially, been accepted by the authorities at Chicago.—In the General Classification Department the California commission will furnish tables, platforms, etc., for the use of exhibitors. Application blanks for space in the California building will be prepared at an early date. Facilities will be given in this building for preserving, preparing and repacking exhibits. In the matter of cold storage for perishable fruits, no decision has yet been reached.—As to how much land at Chicago has been allotted to California for an outdoor display of horticultural, viticulture, and other exhibits, J. M. Samuels, chief of the Department of Horticulture, under date of April 12th, advises the State commission that the proposition is still open to California to use five acres for ornamental trees, shrubs, semi-tropical trees, etc., provided the State commission will indicate to him in detail what is wished to be exhibited thereon. It will be impossible for him to secure five acres in one body. Mr. Samuels writes that the grounds must be arranged with regard to harmonious effect as a whole.—After due consideration the State commission has decided to recommend what is known as the museum glass jar for preserving fruits. Intending exhibitors may correspond with the secretary of the State commission for sizes, styles and cost. Exhibitors must furnish their own jars. The California World's Fair Magazine for April contains an article from Prof. Hilgard on preparations necessary for the preserving of fruits in their natural state. Preserved and dried fruits can be sold at the World's Fair only on orders. No delivery will be permitted from the State building. The mining exhibit, while at Chicago, will be in cases provided by the State commission. Valuable specimens will be enclosed in a safe. Watchmen to guard exhibits will be employed both day and night. All displays will be insured, but the State will be liable only for the amount of such insurance. Special arrangements will be made with exhibitors of minerals in cabinets or specimens of great value. Counties are expected to aid in making collections of minerals.—Each county is expected to make an exhibit of its products at the proposed World's Fair exhibit of California in the Mechanic's Pavilion at San Francisco this fall. The State commission will select exhibits from this preliminary display, store them, and, at the proper time, transport them free to Chicago. It is not compulsory on the counties to submit displays for this preliminary World's Fair exhibit, but the State commission earnestly requests that such display be made.—The State commission hopes to secure concessions from the authorities at Chicago for the sale of California curios, woods, etc.—No literature, giving special features of any county, can be sold in the California building. The State commission will issue gratuitous literature. Free distribution of pamphlets will be permitted when of proper character, but copy should be submitted to the commission for approval. All literature should be attractive. It is possible that sales of California products may be permitted in the cafe, but no concession has yet been granted.—It is desirable for each county to prepare an exhibit of floriculture.—The Women's exhibit in the California building will be catalogued.—The State will arrange and care for exhibits in the California building during the exposition.—Although an appropriation for a general exhibit of the natural flora of the State has been made, it is desirable for each county to assist in making this exhibit a complete one.—There will not be a competitive department in the California building.—Powder or other explosive articles for display are prohibited by general rules. Acids and chemicals, not of an explosive nature, may be exhibited.—County associations may take charge of exhibits placed in department buildings for competition, subject to the rules of the national commission. No premiums will be offered for displays in the California building.—Counties will be allowed to carry out their accepted design in the ar-

range of exhibits, but at their own expense and risk; this, however, to be subject to the rules of the State board.

The Canadian Mineral Act.

The amendments to the mineral act, passed at the present session of the legislative assembly, although somewhat radical, will in the main be beneficial to both the prospector and the prospect buyer. By the changes litigation is made almost impossible, and the discoverer of a good piece of ground is in no danger of losing his just reward by being side-lined by the unscrupulous prospector who does all his prospecting around the office of the mining recorder. Following is the manner in which claims must be located on the amending act receiving the lieutenant-governor's assent, which will be some time next week:

5. Sections 14 and 15 of the said act are hereby repealed, and in lieu thereof be it enacted:

14. Any free miner desiring to locate a mineral claim shall, subject to the provisions of this act, with respect to land which may be used for mining, enter upon the same and locate a plot of ground, where possible, not exceeding 1500 feet in length by 1500 feet in breadth, in a rectangular form; that is to say, all the angles shall be right angles, but the lines need not necessarily be meridional. In defining the size of a mineral claim it shall be measured horizontally, irrespective of inequalities on the surface of the ground.

15. A mineral claim shall be marked by two posts, each post being at least 4 inches square and 4 feet above the surface of the ground. The posts shall be numbered 1 and 2, and upon each post shall be written the name given to the mineral claim, the date of the location and the name of the locator. Upon No. 1 post there shall be written, in addition to the foregoing: "Initial post," the approximate compass bearing of No. 2 post, and a statement as to whether the claim lies to the right or left of the line from No. 1 to No. 2. Thus: "(Name of claim)," "(Date)," "A. B.'s claim," "Initial post," "Direction of No. 2 northeast," "Claim lies to right (or left) of line from No. 1 post to No. 2 post." It shall not be lawful to move No. 1 post, neither shall it be lawful to move No. 2 post, except for the correction of distance by the provincial government surveyor. Nos. 1 and 2 posts shall govern the direction of one side of the claim.

(a) The owner of a mineral claim shall be entitled to all minerals which shall lie within his claim, but he shall not be entitled to mine outside the boundary lines of his claim, continued vertically downward.

(b) This act shall not prejudice the right of claim owners who have located there under former acts.

Another amendment stipulates that before a third location can be made in any mining division, the claim owner must have performed the assessment work on his two former locations. Another reduces the charge for recording assessment work from \$6 to \$2 50.

Shipments of Quicksilver.

During April the mines here mentioned shipped quicksilver as follows:

	Flasks.
Great Western.....	650
Napa Consolidated.....	450
Bradford.....	207
Sulphur Bank.....	130
Baker.....	8
Total for month.....	1,445

The fourteen hundred and forty flasks represent 110,160 pounds—an unusually large amount for one month's shipments. Much of this has come from the Great Western mine, which is rapidly piling up wealth for its principal stockholders—two or three men.

The output of the Bradford mine will soon be largely increased, as they have two new furnaces nearly completed, and we are informed that a third one is in course of construction. It is probable that for a few months after the new furnaces are finished, shipments from the mine will amount to from 800 to 100 flasks monthly.—Napa Calistogian.

TRADES unions must have been very strong even in ancient times, if we may judge by the unanimity of 20,000 mine workers striking for an increase of wages from 17 to 18 cents per day in 413 B. C.—just 2304 years ago—with the result of overthrowing the Athenian Government.

THE Southern Pacific Company is pushing the road from Bakersfield to San Miguel. One hundred men have gone to work on the road. They are principally carpenters and bridge builders.

An Unlucky Tunnel.

On the 12th inst. an accident occurred at Cherokee, 12 miles from Oroville, Butte Co. Three men, named Jack Powers Jr., J. C. Hall and L. P. Hall, were mining in an old tunnel when it caved and killed all three of them. The men have been quite successful lately, getting out in one spot \$1600. The Hall brothers are lately from Montana, while Powers was born in Cherokee. According to an account telegraphed to the *Chronicle*, the three young men undertook to clear out the tunnel for the Spring Valley Co. This tunnel was between half and three-quarters of a mile long, and at the upper end of it was a large cut about 75 feet deep and 100 feet wide. This cut was partially filled with water, and through the tunnel about 400 inches of water was running.

The tunnel was made through bedrock, but the upper end was soft rock, and had caved so that the upper part of the tunnel was filled with water. No one could be hired to remove the obstruction on account of the danger, but the three young men offered to make the attempt for a share of the gold that was contained in the flumes that ran through the tunnel. Of these flumes there were two—one two feet wide and one five feet wide. All three had worked in the tunnel for nearly a week, and they realized the extreme danger. They had gradually cleared away the lower part of the obstructions, and intended to place a charge of giant powder in the remaining one, with a long fuse attached, so as to give them time to get out of the tunnel.

In the morning they told the man in charge to turn into the cut 2000 inches of water, with the idea that when the rocks and timbers were shaken up by the discharge of the powder the water would force everything through the tunnel. It is believed they must have removed a rock or timber that held the jam before they were ready to explode the powder, and that the barrier gave way so suddenly that they were unable to escape.

No one knew of the accident or had any intimation of it till 2 o'clock in the afternoon, when a Portuguese who was working in the edge of the deep canyon below saw two human feet sticking up out of the debris. He had been at work but a short time, and had not seen or heard the rush of the waters down the canyon. He at once gave the alarm, and a large number of men hurried to the spot. They set to work uncovering the body, which was that of one of the Hall brothers. The body was completely nude except an undershirt, and this was pulled over his head.

While some were at work digging the body from the mud and gravel, others hurried down the canyon and found the bodies of the other two men doubled up among the rocks and timbers, but not covered with debris. Not a stitch of clothing, not even their boots, was left upon their bodies. Their heads and faces were badly cut and bruised, but their bodies were not much injured except that the body of one of the Hall brothers had the leg broken. The bodies were taken to the town hall, where they were prepared for burial.

The mine has caused a number of deaths. A few years ago four miners—Dennis Whalen, Ed Lewis and two Portuguese—undertook to clean the same tunnel, that had been stopped by a cave near the upper end. One of the men removed a rock with his pick, and the dam gave way, washing them all out of the tunnel, but neither was killed, owing to there being such a small head of water.

In the same tunnel another man broke his neck by falling down an incline, and one was drowned in a pipe. Four Chinamen were at one time killed by a cave in the mine. One man was blown to pieces with giant powder, one was blinded for life, and seven other men have been killed by caves or in other ways, making in all 17 men that have been killed in the same tunnel.

Gas for Smelting.

THE Boston & Montana Company Solve the Problem Successfully.

As is well known it has been the intention of the Boston & Montana Company to use gas in their smelting process, and for that purpose they built in their new smelter here a number of furnaces adapted to that fuel, and also erected the necessary generators. This enterprise was wholly an experiment. Had it failed it would have been a great loss to the company and would have necessitated the alteration of a large portion of their plant. The result of their experiments has justified their belief that gas could be used with smaller expense than any other fuel, and it practically settles the question for all time.

For some time past Superintendent Kle-

petko has been experimenting with various grades of coal to discover the best and cheapest gas producer. The first trial was with Sand Coulee lump coal and proved to be a failure. The gas could not be produced fast enough to be of any use as a fuel. Superintendent Klepetko then turned his attention to Lethbridge coal, but this, too, was useless as a gas producer. It began to look a little doubtful, when it occurred to Mr. Klepetko to try the slack from the Sand Coulee coal. The result was so successful that Mr. Klepetko feels that the problem of fuel for smelting is practically solved. The slack affords a large volume of excellent gas and its successful production is now merely a matter of detail.

In view of the fact that this slack is sold at the mine for only 25 cents per ton to private consumers, it can be readily seen that in large quantities its cost would be infinitely cheaper than any other fuel.—Great Falls Tribune.

A Strike of Green Oil in Kern.

The oil regions of this county for the past year have been persistently and steadily developed, says the Bakersfield (Kern Co.) *Californian*. Men have taken hold of the enterprise who are not only able to carry it on, but who, with business acumen, have recognized the rich rewards which could be obtained by careful and thorough development.

Well after well has been put down in the Sunset region, each one, until this last discovery, yielding a heavy black oil carrying liquid asphalt, and from the discoveries already made a profitable industry has been built up, of such extent, in fact, that the Southern Pacific Company has commenced to construct a new line of railroad which will command the fields.

But all the time the company operating in that region, being convinced that what is called "green oil" could be found, has been persistently hunting for it, and upon striking black oil would remove its derrick and boring apparatus to another place and try again.

Not very long ago, after making a careful study of the formations, the company decided to operate in an entirely different locality, and so commenced drilling at a place nearly a mile east of its former workings.

At a depth of 470 feet measures carrying green oil entirely free from liquid asphaltum were encountered with a heavy flow of water. The well was kept steadily going downward, and at last accounts was nearly a hundred feet in this oil-bearing stratum, and as soon as the water can be shut off the exact amount of the flow can be determined.

But the capacity of this one well cuts but a very small figure in the case, for quantity can be obtained by increasing the number of wells. Already, in fact, a second well is just entering the oil bearing strata and others will also soon be put down.

The grand fact of the strike is the quality of the oil. It is of a dark green color of about 18° gravity, and the tests which have already been made of it prove it to be the very best of the natural lubricating oils, equal in quality and value to the most famed products of West Virginia.

An expert who has been testing it during the past week has publicly stated that it is a most remarkable oil, not exceeded for lubricating and fuel qualities in any locality. It is already being used for fuel at the refinery in Bakersfield.

This strike, which has caused considerable excitement among those in town who have known of it during the past week, is on Section 28, in the Sunset district, southwest from Bakersfield, and is owned by Messrs. Jewett & Blodgett, and has been drilled under the supervision of W. E. Youle.

The second well, on Section 13, also owned by the same parties, is now down about 400 feet, and already shows a considerable quantity of gas, which is a very encouraging sign for oil in the near vicinity.

The present, as well as the prospective industries of Kern county, have now cheap fuel at their very doors, while the market for lubricating oil of such quality as this recent strike is as wide as the world.

A GOOD MOVE.—We are informed that Messrs. Cook & Hamlen are now making arrangements to erect two 12-foot arrastres about half a mile east of town—below the round house. This is a move in the right direction, and will be the means of causing more work to be done in the mines here, about than anything else that could be done. It will now be possible to work the low-grade ores of the district at a profit, and the work thus done may, and probably will, show to the world that we have one of the best mining districts in the State right here.—Hawthorne Bulletin.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PLYMOUTH MINING NOTES.—Jackson Ledger, May 14: At the Pacific mine a winze is being sunk in the No. 2 level to a depth of 100 feet, for the purpose of testing the ore at that depth. This work is being done where that last chute of ore was encountered. It has been reported here that the Clinton Consolidated Co. will soon be interested in this district in mining. The company's managers have been over and viewed the Alpine and Thos. Bawden claims, adjoining the Pacific mine on the east. Both are patented properties.

GOLD MOUNTAIN M. Co.—Ledger, May 14: The Gold Mountain M. Co. are pushing the improvements along. Charles Dickerman and Bob Lute will soon have the tramway completed. The ditch, under the management of John Madden, is fast nearing completion. Wm. Ford is rushing the ore out of the mine. The 20 stamps are kept right up to their full capacity. This unusual storm has retarded operations to a considerable extent. The old mountain is attracting considerable attention. Phipps, Vaughn and Dunbar are kept busy making improvements around the mill.

THE GOVER MINE.—Drytown Cor. Sacramento Union, May 14: People are building strong hopes on the recent developments and consequent activity in this mine. Among the important improvements, the hoisting works are being remodeled and self-dumping skips of two-ton capacity are going in. So far down as the 1000-foot level the mine has been thoroughly opened, and a new shaft is already down 80 feet below that level. Great ore reserves are being found on every level as they are opened out. The ore along the great mother lode of Amador county uniformly shows an improvement as lower levels are reached, and this is no exception. The Edison General Electric Co. of New York established their first plant in California for pumping mines by electrical machinery at the Gover.

Calaveras.

S. S. VALLEY MINES.—San Andreas Citizen, May 14: Among the mines now being prospected in the Pine Log district, in Salt Spring valley, is the Montezuma, owned by J. Womble, who has also the Gibraltar, an extension to the Pine Log group. They show gold wherever prospected by pan on top. The ledges, ranging from two to ten feet in width, have been mined in early days, giving fair returns with insufficient machinery. Last year 300 tons were taken to Copperopolis for flux, thereby increasing its value by gold from the quartz, which prospected several dollars to the ton, and was taken indiscriminately from several places and given to the Copper Co., which was so well pleased that it offered \$3000 for the claim, which was refused. He now has men at work sinking a shaft to strike the vein at a point 50 feet below the croppings, which is known to be good milling rock. The veins can be traced at least 5000 feet, running southeast and northwest, with dip to east; are encased in talcose slate and sandstone, the geological formation being excellent for pay, giving sulphurets of value up to \$300 to the ton by test, besides the free gold.

El Dorado.

BRANDON DISTRICT MINES.—Placerville Republican, May 12: The Oro Fino mine is pounding away with five stamps. At the Vandalia mine they are still operating on the tailings with the cyanide process. L. H. Brandon and C. N. Turnhoo are working in the tunnel of the French Creek gold mine and getting out ore. It is reported that a party from San Francisco has been examining the mine.

Humboldt.

MINING ON THE SOUTH FORK.—Willow Creek Cor. Blue Lake Advocate, May 14: Mr. Williams, an expert in the interest of a London syndicate, visited the mining ground on South Fork, and was very favorably impressed with the country. An expert in the interest of a San Francisco company is expected to visit and make a report on the Willow Creek ground. Mr. Van Vactor, an expert sent several months ago to make a report of the mines here, says that the ground will pay more to the cubic yard than that in Nevada and Sierra counties. One advantage these mines possess over those elsewhere is that there is no pipe clay to work through. Mr. Van Vactor, in his researches, found that there were three washes of gold. On the low alluvial ground, the fine gold is found; a little higher up, coarser gold; and on the high ridges, the very coarse gold. The existence of a high wash has been verified by the gold found in the Poor Man's Friend mine. Several settlers have worked their claims for the last few years, and have made fair wages. That does not signify that there is no rich dirt here. The miners have mined with giants, having only a small head of water and insufficient pressure, and used sluiceways and riffles of 30 years ago.

Nevada.

QUARTZ MINING AT COLFAX.—Grass Valley Tidings, May 13: The Big Oak Tree Mining Company, owning a quartz claim adjoining the Rising Sun at Colfax, will start work on the property about June 1st. Last week the company bought 12½ acres of ground adjoining their claim from Mrs. Huhley and Mrs. Meyers, paying \$60 per acre. Work on the Rising Sun has been in progress about a month. It is proposed to run a drain tunnel from Bear River to tap the shaft at a vertical depth of 400 feet. The tunnel will be 1800 feet in length, and miners say it will be quite a costly piece of work.

PENNSYLVANIA MINE.—Telegraph, May 12: Superintendent John Eddie brought some ore

to town from the Pennsylvania mine, and it was about as good looking quartz as is generally seen. The ore came from the north drift of the 400 level. Free gold could be seen all through the rock.

CHAMPION M. Co.—Herald, May 12: The Champion Co. has declared a dividend of ten cents per share, aggregating \$3500. Work will be immediately commenced to put in 15 new stamps. They will then have a 25-stamp mill.

PEABODY MINE.—Grass Valley Union, May 15: The water has been pumped out of the Peabody mine to the 400 level, and the work of drifting and stopping on that level resumed. The new 12-inch pump works well, and has done away with the necessity of pumping through the old incline. An auxiliary pump is being put in place below the 400 level, which will pump up the water to the tank on that level, from which the water is raised to the surface by the large pump, and then the sinking of the shaft will be resumed. The present depth of the shaft is 430 feet. Good milling rock is now coming from the 400 level and stopes.

PHILIPS HILL GRAVEL MINE.—Nevada City Herald, May 14: The drift mines owned by Charles Phelps of Phelps Hill, embrace 160 acres of valuable mining land, well timbered, and contains an abundance of free water supplied for mining purposes from never-failing springs. This mine paid well in the good old days of hydraulic mining, and to-day it is paying well as a drift mine. Mr. Phelps undoubtedly has the channel that begins in the vicinity of Bear Valley, passes to Alpha and Omega, thence to Phelps Hill, Relief Hill, North Bloomfield, Lake City, North Columbia, Cherokee, San Juan, and thence farther down the ridge. The claim is developed by means of two tunnels, one of which is in 130 feet, and the other 250 feet. These tunnels are run in two different channels, or rather, one large channel that has split into two different water courses that come together above and below the Phelps claim. One peculiarity of this mine is that it contains a great deal of chrome iron, to which is attached gold and pure copper. The gravel is mostly blue and easily worked. The tunnels run up the ancient river bed, so that they will never, as miners say, "Run out of fall."

THE CENTENNIAL.—Virginia Enterprise, May 11: Superintendent Richards writes that he has suspended advancement in the face of the main tunnel for the present. It is in about 2300 feet. The gravel belt being developed is merely a few feet above the roof of the tunnel and shows well, but the proposition of the management is to proceed forthwith to utilize the rich gravel developed last fall. With this view, crosscutting from the chief upraise above the tunnel is being done, extracting the gravel for washing as soon as the proper sluices and other outside works can be constructed. Snow and bad weather generally interfere at present, and the roads in all directions are demoralized, but as the good season opens all difficulties will be obviated, and golden success must infallibly follow.

THE GOLDEN GATE MINE.—Grass Valley Tidings, May 13: The Golden Gate, comprises a mountain of quartz about three miles south of Limekiln, in Wolfe district. Mill tests of the ore have developed that it will yield from \$6 to \$8 per ton, and it can be cheaply extracted by tunnel. There is some talk on the part of the lessee of operating the mill to be erected by electricity, the dynamo to be located at a point three miles distant, where water power is available. There is in the claim one of the finest deposits of pottery clay to be found in the State, and this, too, Mr. Hardy proposes to develop. Were transportation facilities at hand, this deposit would of itself be immensely valuable.

THE YELLOW DIAMOND.—Nevada City Herald, May 12: Work is progressing favorably at the Yellow Diamond, which was recently purchased by Washington, D. C., parties. Buildings have been erected, the tunnel has been cleaned out and retimbered, and the place is a scene of activity. The Yellow Diamond people have no further development work to do, as the ledge is in sight and there are about 50 tons of ore on the dump. Ground will be broken for a mill some time this season.

A BIO STRIKE.—Nevada City Telegram, May 10: The Harmony people are jubilant, and they have a right to feel so. A few days ago they ran into gravel that will pay on an average at least \$20 to the carload. A chunk of bedrock was brought into town on Saturday, and it was literally lousy with gold. The gravel is said to be the richest ever seen in this district.

Mono.

THE BODIE CON.—Bodie Miner, May 13: During the past week east crosscut No. 1, 700-foot level, was extended 10 feet. East crosscut No. 1, 550-foot level, was extended 12 feet. The ore stopes above 500-foot Jupiter shaft level are looking about the same as last reported.

THE MONO.—During the past week north drift No. 2, 600-foot level, was extended 9 feet. We are stopping out ore, north and south from No. 1 winze. Below 700-foot level the ore stopes are looking about the same as last reported. The mill has been kept running steadily. Average battery samples, \$39.62; average tailings samples, \$7.27.

San Bernardino.

MINING ABOUT THE NEEDLES.—The Needles Eye, May 10: The Brown gold claim is looking splendid. Frank Howard, Bob Irwin and Jimmy Coates have what promises to be something good in their claim, which they call the Alliance. The surface rock went 10 ounces, and the ore two feet down assayed 20 ounces of silver to the ton. Pres. Brown of the Mnsic Mining Company, accompanied by Mr. Hollaway and Mr. Max W. Hardee, came down from Hackberry last Saturday, bringing test samples from that camp for the Needles Reduction Company. It is reliably reported that Messrs. Harshberger and Gill have struck it rich in the

Pittsburg neighborhood. They have a claim about 1½ miles southeast of the Pittsburg, which assays 2565 ounces of silver to the ton. Their claim is called the Mattie Ellen. The Pittsburg grows better every day, and Messrs. Hyde and Hutt have ore always on hand ready for shipment. The Pittsburg is being worked by a force of men under a skillful superintendent.

San Luis Obispo.

NEW MINING DISTRICT.—Paso Robles Moon, May 14: About two months ago, as H. W. Neville and John Bogley were passing through the hills beyond Adelaide, they discovered a ledge of mineral, the outcroppings of which gave evident signs of being rich in both gold and silver. Specimens were secured and quietly sent to San Francisco for assay, and the returns which were received in due course of time, proved the quartz to be worth \$6.20 in gold and \$24.18 in silver. Feeling confident that they had made a discovery that was worth something, they associated themselves with Otto Shackelford and Bert Bray in this city, and laying claim to all that the law would allow them they immediately proceeded to develop the mine. A force of men was employed to drive a tunnel and the work is now progressing satisfactorily. The workmen have now reached the hanging rock which walls in the ledge, and are preparing to drill and blast it away. When this is done the owners hope to have revealed to them a ledge rich with the precious metals.

Shasta.

IRON MINES.—Cor. Redding Free Press, May 14: The iron mines of the McCloud could furnish, with suitable works, the entire State with railroad iron, and all our gold and silver mills with their machinery. And it is the northern mineral belt, on every section of which one mineral or another can be found, that in time will be the consumer of mountains of manufactured iron. The iron mountain of Missouri 50 years ago was the counterpart of the McCloud iron mountain of to-day. The iron mountain of Missouri now is estimated in value by the tens of millions of dollars, and what we see in future will be that of the northern deposit.

Tulare.

OIL WELLS AT COALINGO.—Hanford Journal, May 10: A gentleman recently from Coalingo informs us that in the oil region, ten miles from Coalingo, two good oil wells have been sunk and boring for a third has been commenced. One of them flowed not only oil, but artesian water, and is 700 feet deep. The top of the well is 800 feet above Coalingo, and the water is as salty as brine. The oil has to be pumped from the wells, as it does not flow over the pipe. An engine is used at one well and a windmill at another. The flow of the former is shut off for the present, but the windmill is still at work.

Siskiyou.

THE BALLARAT MINE.—Yreka Telegram, May 13: The Ballarat Co. is running a double shift, and is pushing operations as vigorously as possible. Bedrock was struck some days ago, and showed very favorable indications, although some distance from the main channel. A tunnel, or a series of tunnels, is being run out, by which means the channel will be intercepted, and good pay will certainly be the result. In a short time new machinery, including a new engine and better pumps, will be put in, enabling them to dispose with the large volume of water with more ease than at present, although the large thrashing engine now in use does very serviceable work. As soon as possible, a larger force of men will be employed, by which means work will be greatly facilitated, for at present the space in the shaft being so limited, only a small force can be utilized. Although too high upon the rim, very good prospects are being found, indicating better pay in the vicinity of the channel.

HUMBOLDT MINES.—Cor. Yreka Telegram, May 13: Mr. Marion has had a crushing from the famous old Craggy mountain, which paid exceedingly well. Marion will put on more men and develop the mine to a further extent, he being a mining expert and a capitalist. He also has several placer mines on Shasta river which he intends to work. Rabbitt & Co. are taking out some fine ore on the Schoolhouse ledge. Cartwright & Phillips are taking out some fine ore at a depth of 300 feet.

QUARTZ.—Yreka Journal, May 11: We were shown a solid gold specimen yesterday by Chas. Ross, who works in the North Star ledge of Boyle & Co. at the head of Humboldt creek, which weighed \$54. It was found about 110 feet underground, by Dick Wright, and exhibited a mark where his pick struck it. Dick thought it was a piece of copper, when his pick struck, but on examination, found a gold specimen, and managed to save all entire but a little thin piece. Dick was highly complimented by Mr. Boyle, for his faithfulness in working the claim, as a young man worthy of trust in any position. The quartz in the tunnel contains very rich specimens occasionally, which can be picked out by hand without the necessity of crushing. Judge E. V. Spencer continues to find good paying quartz at his ledge on Humboldt creek, but as he gets deeper down, has more sulphurets, from which it is difficult to save the gold in milling. He has also another good ledge on Humboldt Gulch, a short distance west of Yreka, which prospects well, but contains sulphurets in large quantity. Both these ledges are worked day and night in getting out quartz, and the judge intends shipping a carload of sulphurets from each to the Selby Chemical Works at Port Costa for testing, as the assays made of specimens from each show that the quartz is exceedingly rich. The Humboldt creek quartz assays over \$300 to the ton, and the Humboldt Gulch quartz about \$400, while the sulphurets contain a still greater amount of gold. The Allen Bros. of Quartz Valley have made a good run at their quartz ledge lately, the quartz paying from three to four ounces

per ton. Their ledge varies in width, but will average from 14 to 16 inches. They are getting their mill fixed up in good shape to do still better work in crushing ore. Owing to the cool and blustery weather for the past week or more, the snow has not been melting on the mountains; consequently the hydraulic miners have been unable to do much work in sluicing down the gold banks. As soon as the weather gets warm, as it certainly will be very soon, there will be an abundant supply of water, with plenty of snow on the high mountains to last nearly all summer.

Trinity.

NEW RIVER MINING NOTES.—Weaverville Journal, May 14: The Sherwood mine is opening up well under the lease now working. J. C. Leas and Thos. Nicholson made a clean-up the other day of \$1600, and have ore on the dump for about \$4000 more. Miller & Stone also have out a lot of ore from the same mine that is good. Miller has a two-stamp mill on the mine for crushing the ore; it will crush about four tons per day. Ladd & Clements have a ditch of water on the Boomer mine, washing the tailings; it is paying well. Colgrove, on the Excelsior mine, is taking out some good ore which shows plenty of free gold. Steve Noble & Sons, Clark & Shock and Mr. Parry, on Pony creek, are doing well. Now and then they take out nuggets that make one think of the "good old days of '49." It is reported that the Ridgeway will start up soon. Geo. Dean, who is in charge, has gone to Humboldt county for some castings for Miller's mill.

Tuolumne.

MINING NOTES.—Sonora Union-Democrat, May 14: The coming season promises to be one of unusual activity in mining circles. Many old mines are being reopened and new ones developed. Rich ore bodies are being laid bare in some of our larger mines, and the outlook for successful mining operations is very gratifying. Operations on the world-famed Bonanza mine will shortly be resumed. A large boiler—comparatively new—was used on the Heslep mine at Quartz Mt., has been purchased and placed on the Bonanza. Two new air compressors have been purchased, and they will soon arrive from San Francisco. Six men are employed doing necessary preliminary work to put things in shape to run the mine properly. In two weeks all the necessary machinery will be in position. The mine is full of water, and another two weeks' time will be occupied in removing it. The Black Oak mine has been temporarily shut down. This is an excellent property, and the well-known richness of its ore will prohibit long idleness. Considerable development work will be necessary, when an unlimited quantity of high-grade ore will be encountered. We are informed that a large body of ore, rich in quality, has been struck in the Buchanan mine. Mr. John Gibbons of Chicago and Mr. Mullen of Denver arrived to inspect the Garibaldi mines, situated on the Stanislaus river, where development of ore has been under way for several months past under the direction of Mr. Louis Blanding. Should the mines suit them, as probably they will, a large plant will be erected to work the ores. They were greatly pleased with the location of the mines and the fine water power, whereby the ores can be mined and milled very cheaply. Mr. Gibbons is a leading lawyer of Chicago and editor of the Chicago Law Journal. Mr. Mullen is largely interested in the silver mines of Colorado.

Ventura.

OIL MINE NOTES.—Santa Paula Chronicle, May 10: H. A. Clayton of Nordhoff has leased his land to a Los Angeles company, which will at once put down four wells for oil. The new well being put down on the Robinson lease is now 490 feet in depth. At Four Forks well No. 4 is down 1250, with good oil prospects. At the junction, well No. 4 is to a depth of 600 feet, and is still going deeper. Well No. 1, Pierre lease, has been abandoned and a new location has been selected. They are now drilling in one of the wells in Adama canyon at a depth of 2230 feet. This is said to be the deepest oil well in Southern California. The operators went through 250 feet of a peculiar, light green oil—a kind they have not before seen. A high oil well has just been struck on W. S. Chaffee's place in Torrey canyon. It is reported as being a 60-barrels-a-day well. Well No. 3 on the Robinson lease at Bardsdale struck oil at a depth of 460 feet. The output is about 40 barrels a day. From Chester Brown we learn that they are putting a fine steam engine on top of the mountain at Bardsdale. It is the design to thus have power to furnish all the wells in that vicinity by this one engine. A good deal of excitement now prevails about oil claims near Bardsdale. The leases are being taken rapidly. Well No. 2 at Four Forks is being cased at a depth of 1240 feet on account of caving in. No. 27 at Adams canyon is now down 2400 feet. No. 2 at the Junction is now at a depth of 550 feet.

NEVADA.

Comstock District.

CON. CAL. & VA. MINE.—Chronicle, May 14: 1500 level.—From the south drift at point of connection with the old stopes we continue to extract some ore and fillings of average milling value. From the upraise which was carried up from the end of the crosscut run west 36 feet in from the main south drift, 155 feet south from the shaft station, we have continued to work upward and to extract ore of fair quality. 1600 level.—We have continued prospecting upward from the old sill floor of the old stopes, from which some ore of fair quality is being extracted; add on the east side of the old stopes timbers we have found some ore of very good quality. 1650 level.—Have continued prospecting west from the upraise, 35 feet above the sill floor, which was carried up 50 feet above the southwest drift. Ore of fair quality has been

extracted from the drift run east from the Winze No. 3 (down 73 feet) in working upward from that point. From the north end of the California ground on the west side are working on the old stopes and extracting therefrom some ore of fair quality. 1750 level.—In east crosscuts No. 1 and No. 3 from the main south drift have continued to extract some milling ore. 1800 level.—Along the south end of the drift running south from the crosscut run east from the winze No. 1 sunk from the 1750 level we have continued to extract some ore from the sill floor upward of milling value. In the drift run north from the same east crosscut, at a point 60 feet north from that crosscut, are putting in square set of timbers and extracting some milling ore therefrom. There has been extracted from all parts of the mine during the week 1086 1430-2000 tons of ore, which was shipped to the Morgau mill. The average assay value of the ore worked at that mill during the week, 980 tons, was \$24.52. Bullion shipped to the Carson Mt. assay value, \$4243.29.

OPHIR.—1465 level.—In working easterly from the mouth of the north drift, from the drift run west from the winze 122 feet below the sill floor of the 1300 level, we have extracted and raised to the surface 25 tons of ore, the average assay value of which is \$26.62 per ton. The drift running south 101 feet below the sill floor of the 1465 level, from the Mexican into the Ophir ground, has been extended during the week 23 feet; total length 37 feet—the last 30 feet being in the Ophir ground. Fifty tons of ore have been taken out from this drift and stored in the mine, the average assay value of which is \$19 per ton. The face of this drift is in porphyry and quartz of lower value.

SIERRA NEVADA.—The joint Sierra Nevada and Union west drift from S. N. M. & Union shaft, 900 level, was extended during the week 33 feet, making total distance west of shaft 1963 feet; face in porphyry.

UTAH.—From the west crosscut, at a point 595 feet from the shaft, the north drift has been extended a total length of 118 feet, continuing in vein porphyry showing in narrow streaks of quartz and clay separations of low assay value.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced during the week 33 feet; total distance west of shaft 1963 feet; face in porphyry.

ANNES.—On the 420 level west crosscut No. 3 from North drift on east side of ledge advanced 25 feet; face in clay and porphyry.

BEST & BELCHER.—900 level.—East crosscut No. 1 has been advanced 19 feet through porphyry; total length, 114 feet. Have done some work repairing in west crosscut No. 1, also advanced it a distance of 8 feet; total length, 222 feet; face in porphyry and quartz giving low assay value.

GOULD & CURRY.—200 level.—Northwest drift, 435 feet west of shaft, has been extended 18 feet, through porphyry and stringers of quartz; total length, 271 feet. 400 level.—East crosscut No. 1 from northwest drift has been extended 10 feet; total, 36 feet; face in hard porphyry. On Sinto Tunnel level the joint north drift with Savage Company has been advanced 23 feet; total length, 451 feet; face in porphyry.

HALE & NORCROSS.—On the 900 level are stopping ore from above this level. Winze from this level near our north line was sunk during the week 15 feet; total depth, 100 feet. It connected with the ore stopes above 1100 level. This connection will enable us to do considerable prospecting between 900 and 1100 levels. Hoisted from this level during the week 211 cars of ore. 1100 level.—We are taking out ore from above and below this level. Hoisted from this level 271 cars of ore. 1300 level.—East drift near the incline extended 20 feet; total length, 35 feet. No work is being done on the 1500 and 1600 levels by this company. Have men on repairs where needed in the mine. Hoisted during the week 482 cars of ore. Shipped to Brunswick mill 431 1680-2000 tons. Average assay of railroad-car samples of ore shipped to Brunswick mill for week, \$23.03. Battery assay for the week, \$15.36 per ton.

CHOLLAR.—Are repairing the north drift on the 450 level. We are putting the north drift on the 950 level in working order, preparatory to crosscutting on that level.

BULLION.—The joint Potosi winze is down 281 feet below the 1500 level; bottom in porphyry and quartz. The east crosscut, 320 feet south of north line, 1300 level, is out 120 feet, the last 85 feet in quartz yielding low assays. South drift, at a point 85 feet east of the west boundary of the quartz is in 29 feet; face in quartz. The east crosscut, 340 feet south of north line, 1500 level, is out 113 feet; face in porphyry. The joint northwest drift from the 1800 level of the Ward shaft has been cleaned out and repaired a total distance from the shaft of 300 feet.

WABN COMBINATION.—The joint Alpha and Exchequer south rift from the north line of Exchequer, 1800 level, has been extended during the week 25 feet through a mixture of quartz, clay and porphyry. The joint northwest drift from the 1800 level has been cleaned and repaired a total distance from the shaft of 300 feet.

POTOSI.—The winze is down 281 feet below the 1500 level; bottom in porphyry and quartz. Extracted and sent to the mill in the past week 393 1100-2000 tons of ore from the 930, 1100, 1150 and 1250 levels. At hand at mill, 95 1300-2000 tons; average battery assay, \$24.65. The northwest drift from the 1800 level of the Ward shaft has been cleaned and repaired a total distance from shaft of 300 feet.

ALPHA.—The Exchequer and Alpha south drift from the north line of Exchequer 1800 level, Ward shaft, has been extended during the week 25 feet through a mixture of quartz, porphyry and clay.

EXCHEQUER.—The joint Exchequer and Alpha south drift from north line of Exchequer, 1800 level, Ward shaft, has been extended during the week 25 feet through a mixture of quartz, clay and porphyry.

OCCIDENTAL.—The west crosscut from the south drift, 400 level, is in 401 feet; face in stringers of pay ore. The south drift from said crosscut is in 27 feet; face showing a small seam of pay ore. The north drift from same crosscut is in 34 feet, showing a little pay ore. The north drift, 450 level, is in 84 feet, showing fair milling ore.

CON. NEW YORK.—The north drift, No. 1 crosscut, is in 13 feet in ore yielding fair assays.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 730 feet; face in gypsum and porphyry.

Kennedy District.

AN INTERESTING LETTER FROM AN OLD ESMERALDA MINER.—Cor. Esmeralda Bulletin, May 11: Kennedy district is situated in the southeast corner of Humboldt county and about 60 miles south of Winnemucca, three miles from the west side of Pleasant valley, in a low range of mountains. The formation is a soft granite or gneiss, as some call it, with quartzite running through it. The ledges run north and south, dipping west at an angle of 30 to 45 degrees, and are well filled in between walls with talc and porphyry. The ledges range from one to four feet. The Cricket (the original location in camp) has a ledge ranging in size from 10 to 30 inches of ore. There is a tunnel in on it 150 feet, with pay ore the entire distance. The assays run from \$30 to \$180 gold and silver, with 100 tons of ore on the dump. This ore is highest in silver—from \$15 to \$25 gold. The Imperial is a larger ledge, and it is the best property in the camp. It has a ledge 18 inches to 34 feet, with a shaft down 40 feet, through ore the entire depth, with a tunnel started 150 feet down the mountain, which is in 70 feet, running for the shaft and running through ore the entire length. This ledge runs \$20 to \$160 gold—\$20 to \$200 silver. Kennedy has just received returns from some ore he shipped for a test sample of three different lots. The lowest was \$16 gold, 45 ounces silver; the highest \$81 gold, 38 ounces silver. The ore all carries from 10 to 50 per cent lead. He has now on the two dumps 170 or 180 tons of this kind of ore, with an ore chute 150 feet ahead of the tunnel, that crops out as prominently as that where he has run, making it continuous for over 200 feet, with the ore increasing in value and ledge getting larger as we gain depth. There is also a tunnel in 185 feet that will tap the ledge over 200 feet below the shaft, which will develop the property pretty well when it is in to the shaft.

St. Louis District.

MINING NOTES.—Cor. Esmeralda Bulletin, May 11: Joe Gilbert and Jerome Farrier last week uncovered a body of ore on their extension of the St. Louis lode, at a depth of 40 feet from the surface, fully equal to the high-grade ore characteristic of the district. This find is regarded as important, not only to the fortunate owners and as an additional evidence of the hidden wealth of the district, but to prospectors, as it explodes the theory of snides, claiming to be experts, who hold that quartz ledges maintain a uniform course. The St. Louis crops out and is easily traced the entire length of the claim, but little beyond. Acting upon that theory, Gilbert & Farrier sunk a shaft 100 feet; no ledge found; they then sank on "indications" some considerable distance off the trend of the St. Louis, with the result above stated. Jack Manny and M. Walsh have the chief mine yet opened in the district. They have about 25 tons of ore on the dump—eight tons first-class sacked and ready for shipment. The Plamenez Company is preparing to work the St. Louis claim on a larger scale than formerly. Good ore is being taken out of the Sprat & Tracy ground by lessees. This district has a bright future. Its area covers Tule Canyon, noted for its placers. At the State Line (eight miles distant), R. H. Stewart, keeper for George Crocker, is taking ore of high grade from one of the groups of claims formerly owned by the State Line Company. At Gold Mountain, Dutch Chris, the proprietor of the principal mines and steam arrastre, having fortified himself with a stock of supplies, will start up business at once.

Ferguson District.

ACTIVE PROSPECTING.—Pioche Record, May 12: Reports from Ferguson show that active prospecting still continues and new locations are made every day and in every direction from the first mines discovered in the district. This shows the existence of a very large mineral belt in that vicinity, and supports the judgment of nearly every man who has visited there that the district is bound to be a big producer. The first locators are getting down to work also. Jas. Hutchinson, a mining man from San Francisco, has bonded the properties of Samuel Reed, and will proceed at once with development work. After a stipulated amount of work is done, Reed is to convey to Hutchinson eleven twentieths of the whole, and a corporation is then to be formed. The April Fool claim still continues to develop and hold its own as the richest mine so far found in the district. The owners can't be touched yet on the matter of selling. The claim of John Vietti does not look so well as it did last week, a lime horse having been struck, but the formation leads to the belief that the ore body will come in again as strong as ever in a few feet. Gov. Goodrich and Henry Tracy have located three claims on a big ledge three miles north of the Magnolia, the surface croppings going \$15 a ton in gold.

Pioche District.

SMELTERS GETTING READY.—Pioche Record, May 12: Everything at the smelters points to an early resumption of business. The boilers have undergone a thorough cleaning, and everything around the works put in good running order. About ten men are employed, and as soon as the refinery is finished, it is calculated to start up the works to their full capacity.

MINING IN SOUTHERN HUMBOLDT.—Cor. Winnemucca Silver State, May 13: Unionville is

very quiet just at present; the Arizona mine has been shut down for some time, but they expect to put some men to work soon. I. M. Springer and J. C. Campbell are working placers below the old Pioneer mill. The boys have been prospecting for about eight months and have at last struck a place which bids fair to pay them well; saw them one afternoon pan out one panful of dirt in which there was between five and six dollars in g. l. d., and another with about one dollar. There are about 100 Chinamen placer-mining in American canyon; they are taking out plenty of gold. In Spring valley there are about 12 Chinamen working with pan and rocker. J. B. Foltz has his hydraulic works running at full blast; he works day and night, two eight-hour shifts; has plenty of water; he employs about eight men; has commenced at the lower end of the canyon and is working up; has good paying ground enough to last him 15 or 20 years. J. M. Terry has a gold quartz ledge in Spring valley and is running an arrastre steadily crushing the rock, and gets good returns. Robert Pfleger is still working on his mine at Sanborn; it has a good showing. James Hendra has a few men at work on his gold mine at Dun Glen and they are taking out considerable ore. Captain James intends to start up his five-stamp mill as soon as the weather will permit and the ground dries off enough to enable him to haul quartz and sagebrush to the mill. There are about 75 Chinamen working in Rockhill canyon at placer mining, and I am told they are taking out some fine nuggets.

THE CARSON DREDGER.—Virginia Enterprise, May 12: J. H. Rae, Manager of the Carson River Dredging Company, was on the Comstock yesterday afternoon. He reports good progress, and definite returns would now be making toward sulphuret and bullion returns were it not for a change being made in the main pump. The hydraulic affair had to be abandoned as not sufficiently efficient, but he has no doubt but that the new centrifugal pump now being adopted and placed in working position will bring about the desired success.

ARIZONA.

GOLD-MINING PROSPECTS.—Phoenix Herald, May 12: The Maricopa Gold and Silver Extraction Co. of this city seem to have an immense amount of test work to do. The mining men of the Territory are turning their attention to gold-prospecting this season, and, judging from the samples of ore that are coming in almost every day, Arizona is full of the precious metal. Hardly a day passes but what one or more samples of ore come in from some part of the Territory. A great majority of the ore, when assayed, shows it to be of average richness, and a good deal of it is exceptionally rich. The fact that gold-mining is again being revived and taken hold of so earnestly by miners, indicates one of the most prosperous years in that line that this section of country has known for years. Every portion of the Territory is receiving its share of attention from the prospector, and good reports are received on every hand. Again, capital is coming in to develop mining properties more eagerly and rapidly than before in some time. This shows increased confidence in Arizona's mines. Millions of Eastern dollars will be put in this year to develop Arizona mining property, and the result will bring Arizona before the country as one of the richest mining sections in the United States. The prospects were never better, and Arizona may well feel proud of the season of prosperity that is just dawning.

PRESIDENT NOTES.—Courier, May 13: A teamster team returned from Garland siding, where it took a carload of rich concentrates for Jack Lawler, from which point they will be shipped to Denver. Another bar of bullion has been brought in from the Quartz Mountain camp. The mill is running steadily, and Supt. Taylor has about 30 men at work in the mine. J. D. Helm and J. W. Cover of Foy mine, Tip Top district, report a good deal of chloriding going on; report a shipment of ore at Antelope, from Jesse Robeson's mine in the Black Canyon country, awaiting shipment to the Big Bug smelter. John S. Jones loaded two teams with lumber and the balance of the 60-foot smoke stack for his Chapparral Gulch quartz mill, yesterday. He will send out several more teams on Thursday. The boiler is now being put in place and he expects to be running by steam by the first of June.

KINGMAN.—Mohave Co. Miner, May 14: Gold properties in Mohave county are being eagerly sought after by outside capital. The gold strike of Russell, Zeimer & Co., below town, is showing up better and better every day. The shaft is now down 30 feet and shows up ore freely speckled with gold. Work on the Arnold mine has been suspended, awaiting the arrival of timbers and other necessary supplies. As soon as possible, work will be resumed in earnest and the shaft sunk to a depth of three or four hundred feet. Manuel Martinez has nine men at work on the Diamond Joe mine and is taking out considerable good-grade silver ore. There is now on the dump, ready for shipment, 200 sacks of ore. The new mill at El Dorado canyon is now running on ore from the McGregor group of mines. John Quinlan is superintendent of the property. The mines are looking fine and will be put in good shape the coming summer. The Plattsburg mine of Hyde and Hutt, in the Chemehueva mountains, is steadily producing high-grade ore. There is now on the dump about 20 tons of ore, ranging in value from \$250 to \$500, besides a large quantity of ore of a lower grade. The ore is being assorted with a view of getting only the high grade for shipment. Wm. Ridenour, while doing a little work on his copper property north of Peach Springs, opened up the vein to a somewhat greater depth than it had been before worked. His labors were rewarded by having his vein of ore change into a four-foot lead of solid copper glance, running 70 per cent copper and 23

ounces silver. The ore is the most beautiful, as well as the richest, copper ore we have ever seen in the county. We learn that the property has been bonded to Eastern parties for something over \$100,000.

CAVE CREEK ONYX.—Phoenix Gazette, May 12: Geo. H. Reynolds arrived yesterday from St. Louis to look after his mining interests. He has made arrangements to increase the working force at the Cave Creek onyx mines, and instead of shipping one carload of stone a week, the amount will be increased to three carloads a week for the present, with a chance of making it a car a day within a short time. Mr. Reynolds finds great demand for this onyx, and he will find it difficult to furnish enough until he gets his arrangements completed for handling it, and gets the mine opened up in better shape. The principal market will be in New York, though many tons of this valuable stone will find its way to other Eastern cities.

LOWER CALIFORNIA.

THE IRON INDUSTRY.—Ensenada Californian, May 6: The steamer Carlos Pacheco on her next trip from San Quintin will stop at San Isidro and bring up to San Diego 20 tons of the celebrated Tepustete iron ore. The ore is to be shipped by fast freight eastward and to England. It is understood that the English syndicate which has contracted for a large interest in the mine from Gen. Webb, received such remarkable results from recent treatment of the ore that it is now preparing the treatment on a large scale in their English furnaces for the use of their contemplated works on this bay. The ore has proved to be what is called Bessemer, and can be run at once into steel. It is said that the steel for the company's proposed furnaces at San Diego has already been accepted by the engineer. The Union is in possession of further facts in the case, but prefers to let the company's work speak for itself, which it will do very soon. There appears to be ample financial and business backing to the present undertaking.

OREGON.

ENGLISH CAPITALISTS.—Salem Statesman, May 10: At a meeting of the stockholders of the Gold Mountain & Dry Gulch Consolidated G. & S. Mining Co., called for that purpose yesterday afternoon, the directors were clothed with power to dispose of the mining property of that company located in the Santiam country. The company is now negotiating with a syndicate of English capitalists for the purchase of the mines, which are in the Quartzville district. The English capitalists say they will put a \$75,000 stamp mill in Dry Gulch if the property proves to be as represented after they have thoroughly prospected it. They say they will take up all of the stock and give the directors \$50,000 stock in the new company when the property is turned over to them. It is their purpose to have the mine inspected, and it is understood this will be done soon. If the prospects are good, it begins to look as if there would very soon be great activity in the mines of the Santiam.

JACKSON CO.—Jacksonville Democrat, May 13: Scott & Short are working a very promising ledge in Sterlingville precinct. The quartz is not abundant so far, but very rich. Houck & Co.'s new quartz mill last week arrived at Gold Hill and will soon be ready for crushing ore. It is a valuable addition to the mining interests of this section. DeBar & Co. are making excellent progress in developing their mine in Willow Springs precinct. They are down quite a distance, and the ledge is improving both in size and richness. J. W. Sherer & Co. of Galice creek are taking out \$100 per day with two men and a giant. Their mining property on Grave creek, covered by a five-mile ditch, is said to be even better than their Yank ledge diggings. E. Lister of Grant's Pass has bought the interest of Edward Keislin in the Anderson mine in the Applegate district for the sum of \$800. Work of development will be continued as fast as possible. Quartz from this ledge has been crushed in an arrastre for some time past with good results.

SOUTH DAKOTA.

BEAR GULCH TIN.—Deadwood Pioneer, May 11: The probabilities are that the present season will see an extensive tin reduction plant erected at Bear Gulch and the extension of the B. & M. Railroad to that region. Dr. Scott, who has been spending the past few weeks in this city, ostensibly to study law, but in reality to find some method for a profitable investment for the funds of a wealthy Philadelphia syndicate which he represents, recently paid a visit to Bear Gulch in company with W. H. H. Bowers, the representative of the Colorado Iron Works. While there, a thorough inspection of the tin mines was made and samples brought back to Deadwood. A series of experiments was made by Dr. Scott, and with the use of a new flux he was able to reduce the tin stone very cheaply. As a result, he ran out an eight-pound bar of tin. Some of the rock he brought back was very rich, running as high as 20 per cent metallic tin. He is of the opinion that tin in paying quantities exists in Bear Gulch sufficient to supply the world, and he will probably take hold of the matter with a view of properly developing it.

NEW MEXICO.

NOT ENOUGH COAL.—Southwest Sentinel, May 3: R. A. F. Penrose, Jr., and D. M. Barringer, the Philadelphia mining experts, who have been here for several weeks, have returned to Philadelphia. They looked over the Territory pretty thoroughly for coal and went to the much talked of fields between the Mogollons and Gallup, but found that there was not coal enough there to make coal mining profitable.

MECHANICAL PROGRESS.

Coke Oven Progress.

At the meeting of the Society of German Ironmasters held in Dusseldorf not long since, Herr F. W. Lurmann, of Osnabrück, read a paper on "Coke Oven Progress, with Special Regard to Obtaining By-products," of which the following is a summary: For obtaining by-products in coke oven working, which began some 35 years ago and at first met with little acceptance, the Hoffmann-Otto oven takes first rank, there being at present in Germany 1205 of these ovens. The installation of a group of 60 ovens costs 300,000 marks (£15,000), the necessary condensation apparatus 420,000 marks (£21,000). Such a group treats in the course of a year from 57,000 to 70,000 tons of coal with an average result of from 65 to 77 per cent of coke, 2.5 to 4.5 per cent of tar, and 0.8 to 1.25 per cent of sulphate of ammonia. The Semet-Solvay oven, the construction of which permits of a stronger formation of the covering masonry, attains a very high temperature, and good coke can be obtained with an addition of from 23 to 27 per cent of thin coal. From the same cause the yield is greater than, for example, that of the Coppee oven, which, however, is also a satisfactory oven, 1000 being in use in Great Britain. For some three years benzene has been obtained direct from the coking gases; the necessary apparatus, invented by Herr Franz Bruck, is a secret; it costs 5000 marks (£250) per oven. From 3 to 7 kilogrammes of benzene are obtained from 1 ton of coal. The value of the by-products amounts, for a Hoffmann-Otto oven irrespective of benzene, to from 3400 to 5000 marks, the average being 4600 marks (£230); for all the ovens of this system in Germany, 5,600,000 marks (£280,000). The old idea that in obtaining by-products the quality of the coke is prejudiced no longer, appear to hold good. In the discussion which followed, Herr Hussener mentioned that a certain water contents, according to the quality of the coal, from 10 to 17 per cent, is advantageous in coking, and that cokes poor in gas are not suitable for obtaining by-products; the limit is about from 80 to 82 per cent coke yield in the crucible.

COLORING BRASS.—A cold method of coloring brass a deep blue is as follows, according to the *American Manufacturer*: 100 grammes of carbonate of copper and 750 grammes of ammonia are introduced in a decanter, well corked, and shaken until dissolution is effected. There are then added 150 cubic centimeters of distilled water. The mixture is shaken once more, shortly after which it is ready for use. The liquid should be kept in a cool place, in firmly closed bottles or in glass vessels, with a large opening, the edges of which have been subjected to emery friction and covered by plates of greased glass. When the liquid has lost its strength, it can be recuperated by the addition of a little ammonia. The articles to be colored should be perfectly clean; especial care should be taken to clear them of all trace of grease. They are then suspended by a brass wire in the liquid, in which they are entirely immersed, and a to and fro movement is communicated to them. After the expiration of two or three minutes they are taken from the bath, washed in clean water, and dried in sawdust. It is necessary that the operation be conducted with as little exposure to the air as possible. Handsome shades are only obtained in the case of brass and tombac—that is to say, copper and zinc alloys. The bath cannot be utilized for coloring bronze, copper-tin, argentine and other metallic alloys.

LOCOMOTIVE MILEAGE.—That English locomotives sometimes make very large mileage, both per year and in total, is shown by the record of the "Charles Dickens," on the London & Northwestern Ry., which has made the round trip daily between Manchester and London (with occasional exceptions for repairs) since 1882, and on Sept. 10, 1891, completed its millionth mile. This is perhaps, says *Engineering News*, truthfully declared to be "a feat without parallel in the annals of railway traveling," as few engines complete their millionth mile, and fewer still do it in nine years, or at the rate of 111,000 miles per year. On the Pennsylvania Railroad, in 1885, the highest mileage which any passenger locomotive then had to its credit was 780,182 miles. Several had about 500,000 miles to their credit for ten years' service, and one had 41,510 miles for three months' work, or at the rate of 166,040 miles per year. The average of all passenger engines that year, however, was 45,936 miles (highest, 79,258), which is quite be-

yond any English precedent, and as several of the Western roads are far exceeding Eastern precedents in respect to locomotive mileage, it may be that some Western road has a locomotive in its service which has made a million miles in ten years. The New York Central has not, and it is likely to remain a very exceptional performance either in England or America until operating conditions have radically changed.

BELTS.—There is a natural law relating to belting, says London *Machinery*, which is not generally known, but which is nevertheless of value in practice. The hug or adhesion of a belt is as the square of the number of degrees which it covers on the pulley. For example, a belt that covers two thirds of the circumference of a pulley requires four times the power to make it slip as it does when it covers only one-third of the same pulley. When first put on, belts are always made tighter than they need be for the work required, in order to allow for the stretching which is sure to follow. They are then run until they become too loose for efficient service, and the process of overstraining and stretching is repeated. When vertical, this stretching of the belt acts directly to loosen it, and the necessity for tightening occurs more frequently than it does on horizontal belts, where the weight between the pulleys maintains more or less tension in the slack side. For this reason a long horizontal belt can hardly be made to slip, without working it to destruction, while the driving power of a vertical belt depends directly upon its initial tension, and this must be carefully looked after to obtain the best results. The position in which a belt may run does not affect the size required for any given duty, but it does affect very seriously the amount of care and attention required to keep it in efficient service.

PROGRESSIVE CATALOGUES.—The assistant librarian of the San Francisco Free Public Library has invented what he calls the "progressive catalogues." The idea is as simple as it is ingenious. It consists of a wooden box about four feet high, with a glass lid. Underneath the lid in the center of the box revolves a hexagonal roller made of wood. A number of thin wooden leaves, on which slips containing the names of books are fastened, lie piled one on top of the other at the bottom of the box. These are hinged together and the end one being laid upon the roller and secured by pins, and the roller turned by means of a handle outside the box, the leaves pass over the roller one after the other. The handle can be turned either way, as each leaf falls securely into its place upon pins ready to receive it, afterward dropping off the roller on the other side. The principle is that of a harrel organ. The machine will save a great deal of trouble in cataloguing, as there are no less than twelve alphabets in use at the present time. Any number of leaves can be inserted, and as these leaves are very thin the capacity of the machine is enormous. The machine was examined by the board of trustees, which adopted a resolution that the librarian should be permitted to try the invention during the present month, doing his work thereby in place of by manuscript.

LEAD-COVERED CONDUCTORS.—The substitution of lead instead of zinc for coating or galvanizing conductors is advocated in an article in *L'Electricien*. Zinc has certain disadvantages—tendency to form an alloy, high melting temperature and tendency to flake. Lead seems to be preferable for certain reasons, and its application is similar to that of zinc. The objects are cleaned electrically, and immersed in an aqueous solution containing 10 per cent of hydrochloric acid and one per cent of hydrofluoric acid, heated to 50° C. in a vessel coated with lead. They are connected to one pole of a dynamo as anode, the lead coating constituting the other pole. After this preparation they are dipped into limewater of the same temperature, and then into an alloy of equal parts of zinc and tin in hydrochloric acid, which greatly favors the adherence of the melted lead into which they are then dipped. The process is economical and is not confined to its advantage to iron or steel articles, but may be used for chemical and electrolytic vessels. The iron or steel wires serving as protection in armored cables, it is suggested, might be advantageously treated by this method in preference to the ordinary galvanizing process.

MR. JOHN RITCHIE, in a paper before the Scotch Society of Arts, dwelt strongly upon the fact that the electric motor is a highly efficient machine, and is much better adapted and more economical than steam for hoisting purposes.

SCIENTIFIC PROGRESS.

The Electrical Production of Ozone.

Dr. O. Frolich, of Dresden, after mentioning various laboratory experiments for the purpose, describes the plant as manufactured by Messrs. Siemens and Halske for the production of ozone on a commercial scale. The apparatus in which the discharge takes place is built up of an inner metal tube, kept cool by water, and forming the inner coating; this is surrounded by a celluloid or ebonite tube, and through the annular space between these two a continuous flow of oxygen is kept up. The outer surface of the celluloid tube has a metallic sheath which acts as the outer covering, and between which and the inner metallic tube a constant silent discharge is kept up. Ten such tubes are fixed together in a frame and joined up in parallel, both electrically and with regard to gas and water supply. An open circuit transformer is used, excited by a set of accumulators which also drive a small motor, by the spindle of which a make-and-break in the primary circuit is worked. The rapidity of make-and-break should be high, say 600 per second.

The sharper the variations in the secondary circuit the greater the production of ozone, and for a few tubes the interrupted direct current gives much sharper variations than an ordinary sine curve alternating one. When many tubes are used, however, their increased capacity affects the former and rounds its wave down to a considerable extent, while it does not appreciably affect the alternating current, which is, therefore, to be preferred when very many tubes are used. There appears to be a certain number of alternations which gives a maximum of ozone. The production also increases up to a certain point with the rate of the passage of gas through the tubes, but beyond this point increasing the gas has no effect.

The amount of energy expended in the actual formation of ozone is extremely small. It makes very little difference in the total work done if the space between the tubes be filled with gas, water or highly rarefied air. A 2-horse power apparatus produces about 2.4 milligrammes of ozone per second. It would greatly increase its usefulness if ozonized air could be compressed like oxygen, but this presents difficulties, as special pumps must be used. So far, the author has not got beyond nine atmospheres. Various uses of ozone are mentioned, such as disinfecting ships and buildings, destroying insects and sterilizing water, treating sewage, and also for brewing purposes.—*Am. Gas Light Journal*.

RAINFALL RECORDS.—In the annual report for 1892 of the Berlin branch of the German Meteorological Society, Professor G. Hellmann gives an account of his continued experiments, which are summarized in *Nature*, on the effects of exposure on rainfall records, and on the determination of the distance apart that rain gauges should be erected in order to obtain an accurate account of the rainfall of any district. Simple as the question appears, the experiments, which have been carried on for seven years, have not sufficed to give a definite answer. Very considerable differences are found in the amounts recorded at stations comparatively close to each other. This result is partly owing to the effect of wind, especially in the case of snow. The following are the most important conclusions derived from the experiments: (1) The more a rain gauge is exposed to the wind, under otherwise similar circumstances, the less rainfall it records, and the higher a gauge is placed above the ground, the less rain it catches, as the disturbing influence of the wind is greater than on the surface of the ground. But if protected from the wind, a gauge will give useful results in an elevated position. The usual instructions to erect the gauge as openly as possible are therefore incorrect. (2) Even in a flat country, differences of five per cent occur in different months, at stations a quarter of a mile apart; in stormy weather, especially during thunderstorms, the difference may amount to 100 per cent. The amounts recorded at neighboring stations agree better together in spring and autumn, and also in relative wet years. Further experiments are needed, if possible by means of anemometers erected at the same level as the rain gauges, to determine more accurately the effect of wind on both rainfall and snow.

FLARED COAL TAR FOR WATERPROOFING.—According to the *Revue des Travaux Publics*, the use of coal tar as a means of rendering masonry impervious to water is much favored in France. There are two ways of preparing the tar for this use—boiling and flaring. The former method is suit-

able for surfaces intended to be exposed to the atmosphere, while the latter is appropriate for surfaces to be covered up by masonry, earth, etc. By adding to the coal tar a paste made by dissolving Iodine rubber clippings in benzene, a coating may be obtained which is still more resistant, elastic and durable. For roofs, the heat-absorbing quality of the black varnishes may be overcome by dusting them with any permanent white earth before they are quite dry. For masonry to be covered up, the use of flared tar is highly recommended. This is prepared by boiling the tar in a caldron, and filling a bucket two-thirds full from it. The tar is then lighted at the surface and allowed to blaze 15 or 20 minutes, being constantly stirred the while with an iron rod. When a drop from the blazing bucket upon cold stone has the consistency of thick soup, the flare is extinguished by covering down the bucket with an iron lid. The tar will then be reduced to one-third its original bulk, and it must be spread as rapidly as possible upon the work with a cod-tail brush of vegetable fiber—care being taken to dip often, so as to prevent its cooling and hardening prematurely. If the flaring process is prolonged beyond the proper moment the result is a brittle product like sealing wax. When the flare is stopped at the right time, the resultant tar adheres very firmly to any surface, and can be immediately covered up with earth. It has a skin both hard and tough, underneath which is a viscous layer about 1-25th of an inch thick, which preserves its integrity for any length of time.

A NEW ETCHING PROCESS.—A new process of attacking metals by means of acids, by which intricate and beautiful designs can be produced, has been introduced by Wm. Hyland of New Haven, Conn., says *Iron Age*. It is a common method of ornamenting metal to apply to the surface a coating in such a way as to leave exposed the surface of the metal which it is desired shall be acted upon by acids or by the electroplating process. The coating ordinarily employed when the metal is placed in what is generally called "ormolu dip," which is a very strong and hot acid bath. The essence of this new process is found in the coating employed, the acid-resisting properties of which are such that, after the metal has been coated, it is simply placed in the bath and allowed to remain there until the desired effect is produced, which is a granulated or what is termed a satin or ormolu finish. The surface coated, of course, retains the natural finish of the metal. It is evident that the process can be employed so as to produce a natural surface on a treated ground, or the reverse. With the process, designs of the most elaborate description can be obtained.

ELASTIC VEGETABLE MATERIAL.—A peculiar vegetable material has recently been imported into this country from Oran, an Algerian port on the Mediterranean sea, which is said to possess the quality of being so elastic that it can be used as a substitute for springs and the like in the manufacture of furniture backs and seats. This material is so expansive, and so easily affected by high temperatures in its dry state, that when packed the bales have to be held in place by means of heavy steel bands. The peculiarity of this grass is that it thrives only around the volcanic slopes of Oran, and flourishes up to within a short distance of the craters themselves, the latter being always in a semiactive state, and the earth around so warm that not a plant of any kind can thrive or is ever seen to grow, except this steel-like product.

CONSIDERING some of the claims that are being made now, it may be well to recall the fact, says the London *Engineer*, that during the electrical exhibition of Turin, Italy, in 1884, there was in operation a transmission of power from that city to the city of Lanzo, a distance of 10 kilometers—6¼ miles. The wire was four millimeters in diameter, or about No. 6, B. and S. gauge. The alternate current dynamo generated 10,000 volts. At Lanzo the power was used to run 60 incandescent lamps of 16 candle power and one arc lamp. At Lanzo there were four transformers of the Gaulard and Gibbs type, in addition to a special one for the arc lamp. On the 25th of September, in the presence of the international jury, it was found that the efficiency was 89 per cent. Messrs. Gaulard and Gibbs were awarded the grand prize of 10,000 francs by the Italian Government.

ALUMINIUM has been found to be unsuitable for vessels intended to hold preserved foods, as these articles have commonly to be heated in order to sterilize their contents, this treatment injuring the metal.

ELECTRICITY.

Quartz Fibres for Suspension Purposes.

In the electrical laboratory of Queen & Co., Philadelphia, a series of interesting experiments have recently been made upon the properties of quartz fibres for use in suspending galvanometer systems, and in other physical measurements, as compared with fibres of glass, metal and cocoon silk. These tests have resulted so much in favor of the quartz fibres that that firm has decided to prepare them for sale.

These fibres, says the *Electrical World*, are drawn in the oxyhydrogen flame from pure rock quartz, their diameter being regulated by the speed of drawing. As to size, it is possible to draw them from those too fine to manipulate (less than $\frac{1}{1000}$ inch) up to rods $\frac{1}{16}$ inch in diameter, and in lengths (for diameters less than $\frac{1}{1000}$ inch) to $\frac{1}{16}$ inch, as desired. Inspection with a microscope shows that they are extremely uniform in diameter and contain no "fishes" or flaws of any kind.

Some of the advantages possessed by quartz fibres over others are, first, perfect elasticity; they show absolutely no "Nachwirkung" or "set," and, when twisted, come back to the same position immediately. It is thus possible to reach a much higher degree of sensibility with a galvanometer using a quartz fibre in place of unspun silk, for, as is well known, a cocoon fibre, to which is attached a system under small controlling force, will not return at once to the zero point within 5 per cent of the total deflection. Quartz fibres are also unaffected by ordinary changes of temperature or atmospheric conditions, whereas silk fibres, absorbing greater or less amounts of moisture at different times, will have correspondingly different zero points.

The tensile strength of the quartz fibre is from 50 to 70 tons per square inch, which is nearly as great as the best steel and many times that of silk. Fibres of extreme fineness may, consequently, be used, as, for example, a quartz suspension $\frac{1}{1000}$ inch in diameter will sustain a weight of one-half gramme. They are, however, very easily broken by lateral stress, and they are, therefore, raised or lowered as a whole instead of attempting to bend them around a spindle, although the finer ones can be successfully wound upon spindles of a diameter of one-half inch or greater.

The uses of quartz fibres are various. They can be employed advantageously for all electrometer and galvanometer suspensions, and, as suggested by Mr. Boys, may be used to suspend very small bodies, the specific gravities of which are required, as there is practically no capillary attraction between the fibre and water. Being unaffected by heat and of a very uniform diameter, they are excellent for use as cross-hairs in telescopes and microscopes; in fact, they can be used to advantage for any of the purposes for which fibres of other material are now employed, and they bid fair, on account of their many excellent qualities, to displace their older rivals.

TRAINS BY ELECTRICITY.—The *Western Electrician* says that attention has been repeatedly directed to the fact that the present prosperous condition of the electrical business is due in a large measure to the bold and confident policy of manufacturers in championing their systems, and now comes the news from Baltimore, Md., of what to the general public will seem to be one of the boldest propositions yet advanced. A prominent electric railway company has offered to equip the tunnel of the Belt Railroad Company for the running of trains by electricity without the expenditure of a dollar on the part of the Belt Company. The proposition has been accepted, and the electric company agrees to give the railroad the free use of the plant for six months, provided, of course, that if the enterprise proves successful it will be accepted and paid for. While there is not the least doubt but that the electric company will surprise the railway people and show them what electricity can do, one cannot fail to admire this example of that enterprise which has been characteristic of the more successful of our electrical exploiters. In this instance, as has been the case before with a number of other concerns, we find the electrical people shouldering absolutely the entire responsibility of the project, while the railroad company very generously and magnanimously agrees to witness what it doubtless believes in heart to be an experiment. Now that so many rapid transit underground schemes are projected, a demonstration like that which will be made in the Baltimore tunnel will have a most salutary effect in convincing the doubting minds that the one motor for tunnel service is the electric.

THE EFFICIENCY OF THE LAUFFEN-FRANKFORT TRANSMISSION.—The president of the Frankfort Exhibition, Mr. Sonnemann, has made the following announcement as to the efficiency of transmission of the polyphase system between Frankfort and Lauffen: "Official report of testing committee gives mean efficiency in Frankfort at full load 74 per cent, where loss of energy in dynamo, 8 to 10 per cent, included; from this results for transmission proper to secondary transformer at the exhibition a mean efficiency of from 80 to 82 per cent." It is gratifying to note that the minute investigations of the testing committee bear out the statement of the *Times* correspondent, who, from his personal investigations, gave the efficiency as not less than 75 per cent. "The result obtained in the Lauffen-Frankfort experiment," adds Dr. Maier, "is magnificent. It surpasses even the most sanguine expectations and removes any doubt, if doubt still existed, as to the practical feasibility of electric power transmission over a long distance. It is impossible to foresee the far-reaching consequences of this experiment; it is destined to revolutionize all our industrial methods and to lead to a general utilization of natural forces now running to waste."

RECENT PROGRESS IN ELECTRICAL INDUSTRIES.—It may seem almost superfluous to give figures to substantiate the statements that have been made about the almost abnormal growth of the electrical industries; but for the benefit of the skeptical, as well as for others interested in the actual figures, the *Electric World* has compiled the following, which fully substantiates the claims made regarding this growth. From the reports of the various Secretaries of State, it appears that in the last eight months 284 new central lighting stations were incorporated, representing a capital of \$100,192,900; 133 new general electric trades, representing a capital of \$67,946,500, and 105 new street railways, representing a capital of \$61,100,300, not all of which, however, were electrical, although we have no doubt it will be found from detailed reports that by far the larger part of them were, as it is difficult to conceive that at the present time anything but electric and cable roads would be projected. The grand total of all these for the past eight months is \$229,239,700.

OIL INSULATORS.—The oil insulators, which worked so well in the Lauffen-Frankfort experiment, and to which so much of its success has been attributed, seem not to be working so well between Lauffen and Heilbrunn, as they have all been abandoned on the high pressure part of that line. That installation is a permanent one, transmitting about 600 horse power from Lauffen to the cement works at Heilbrunn about six miles away. A 50 volt Drehstrom current is transformed up to 5000 volts for transmission, and then transformed down again for use, first to 1500 and then to 100 volts. The reasons for this failure of the oil insulators at such a comparatively low pressure, when they had successfully withstood over five times as great, does not appear, as Herr Meissner, the engineer of the undertaking who stated the fact before the Elektrotechnische Verein at Frankfort, recently declined to answer questions as regards the cause. Electricity.

IT IS NOT ALWAYS THUS.—An interesting and amusing instance of the efficacy of the London-Paris telephone occurred the other day which is worth recording. The Salvation Army band were marching from the Royal Exchange, London, playing the "Marseillaise," when an idea struck the men present in the telephone room. The windows and doors were thrown open, and the attendant at the Paris end was asked if he could hear anything. The response (in French) was immediate, "Yes, I can hear a band playing the 'Marseillaise.'" That a band of music playing in the streets of London could be plainly distinguished in Paris is, we think, a sufficiently striking marvel of nineteenth century science.

AN ELECTRIC PLANT.—The Alaska Mining Company, whose property is located at Pike City, Sierra county, is making arrangements to put up an electric plant to do the pumping and hoisting. It is intended to obtain the water power from the Middle Yuba river, with which to drive the dynamos by the use of Pelton wheels. Some years ago the Alaska was a large gold producer, but there was such a heavy body of water to contend with that the cost of keeping it under control was enormous, and the company finally gave up the contest. By the use of electric power it is estimated that the cost of pumping will be greatly reduced, and that the mine can again be placed on a profitable working basis.

GOOD HEALTH.

Organisms in Surface Water.

Thos. N. Drowne, in a report to the Board of Health of Newport, has the following to say on this subject: "The excessive development of vegetable organisms in surface water, with all its attendant evils, may be briefly explained by the statement that there is abundant food to support these organisms. In all surface waters these vegetable growths are found to a greater or less degree, and the reason why some bodies of water have few and some have many is that the former contain but little food for their support and the latter contain much. The analogy between poor crops on a barren, rocky soil and an abundant harvest on good soil, richly manured, is one that may serve our purpose by way of illustration.

A good deal of information on this subject has been acquired by the recent investigations conducted by the State Board of Health of Massachusetts. Some of the conclusions that have been arrived at in the course of these investigations are as follows:

1. Polluted waters of ponds and reservoirs, that is to say, water that receives readily decomposable organic matter, such as sewage or the drainage from houses, stables, manured fields and the like, is more liable to give trouble from vegetable growths than that which is free from such pollution.
2. Artificial storage reservoirs, which have not been cleaned before flooding, by the removal of all trees, shrubs, and rich surface soil, supply, by the decomposition of this vegetable matter, the conditions for an abundant development of organisms.
3. Shallow ponds and reservoirs, and those with much shallow flowage, are more liable to give trouble than deep ponds and reservoirs.
4. The larger amount of decomposable organic matter present in the water, the greater the probability of the development of blue-green algae, which are highly nitrogenous, and give on decomposition the characteristic pig-pen odor.

SHADE TREES ON CITY STREETS.—Shade trees on city streets have been condemned by sanitarians as inducing dampness and shutting off air and sunlight. While this is perfectly right under the conditions frequently afflicting us, says G. N. Bell in the *Sanitarian*, other conditions may be promoted that render tree-planting on our residence streets both advantageous and pleasing. Assume an average city street 60 feet in width and running due north and south. On each side of the roadway there will be a footway of 12 feet. Let us pave but seven feet of this. The depth of the lot, we will say, is 125 feet. Allowing 65 feet for the depth of the house, there will be 60 feet depth of yard room. Thirty-five feet in the rear ought to afford ample drying room, and we can then set our house 25 feet back from the street. From the front of the house, then, to the curbstone there will be 37 feet. Midway between the edge of the paved sidewalk and the curbstone affords a line for the location of trees over 35 feet from the front of the house. Trees at this distance from the house obstruct no air nor sunshine detrimental to residents, and the cost of the trees is comparatively small in consideration of the increased value of the adjoining properties. On streets running east and west, trees are advantageous on the north side only.

CHARACTER AND EYES.—A far-searching individual, who has apparently made a very deep study of the pigmented cells of the iris, tells us that a person's character can often be best told by the color and depth of his eyes. People do not usually apply more than four or five colors to eyes, so that any that are not blue, or black, or brown, or hazel, are called gray. Yet there are a hundred different kind of gray eyes. You seldom see a stupid person with gray eyes, but the genuine gray is always found among highly intellectual people. Steel-gray eyes with large pupils denote intense feeling; blue-gray eyes are generally possessed by people with kindly hearts. You never find a mean spirit behind a pair of blue-gray eyes. Blue eyes denote quickness of thought, and generally fine physical development when they are large and bright. About nine-tenths of our engineers, lighthouse-keepers, policemen and army and navy officers, and many others selected for physical perfection, have blue eyes. Hazel eyes denote musical ability and grace of person; they are very pretty eyes, too. Our omniscient informant does not make it clear: Which is cause and which effect? Does individual character affect the color of the eye, or does the color of the eye affect the individual character?

USEFUL INFORMATION.

IMITATION FUR.—A recent invention of English origin is that of a looped fabric finished in such a manner as to imitate very closely the skins of bears, buffaloes, sables, foxes and other animals. In the process of making the material, the loops which constitute the pile are formed in different lengths. After the weaving of the fabric, the loops are drawn out by a revolving wire brush or card, and this process finishes the ends of the threads so as to make them finer at the points than at the roots. The pile is then formed at different lengths, consequently the resulting fur is thicker at the bottom than at the outside, thus most nearly resembling the real fur to be imitated. The fabrics made in this way are intended to be used as carriage rugs, door mats and for other purposes, the effect being, it is said, so good that the imitation cannot be detected except on close inspection.

DRILLING VS. PUNCHING IRON.—If the punch was boycotted in every carriage shop, this last means of getting rid of an objectionable article would contribute a little to the benefit of mankind. There was some excuse for using the punch before the days of twisted drills and improved drilling machines; now there is none, as the time necessary to drill through most irons that have to be punctured in a carriage shop is too slight to serve as an excuse for doing so much damage as is done when the punch is used. Driving the punch through a piece of iron weakens the fibers to a greater or less extent; it bulges when the metal is not very heavy outside of the holes. The drill on the contrary, cuts away the metal and leaves the iron around the holes intact.

TUNGSTEN has come prominently forward recently for use in alloying with steel, the resulting metal possessing great resisting power to heavy blows. The demand for wolfram, the principal ore from which the tungsten is obtained, has increased considerably, and as the supply is somewhat limited, the market price has risen to a higher figure than has been obtained for years. Recent experiments, says the *Manufacturers' Gazette*, tend to show that tungsten steel will come into extensive use in the manufacture of war material, probably taking the place of the nickel alloy.

R. G. CUPTELL, a prominent glass manufacturer, claims to have discovered the lost art of casting glass tubes, which is known to have been practiced by the Egyptians. He has interested capitalists in his invention, and has erected a factory at Pendleton, a small town near Anderson, Ind., and recently made his first cast with success. The glass tubes are suitable for sewer, gas and water mains, and are joined by a glass cement, also the invention of Mr. Cuptell. The factory is a large one and all operations are conducted with the greatest secrecy.

PRIMARY BATTERIES.—The *Manufacturers' Gazette* says: If some one would devise a primary battery which would meet the demand which the introduction of the electrical apparatus calls for, they would be sure of a fortune in a very short time. There is not a primary battery on the market to-day which gives anything like satisfactory results, the nearest approach to it being the old-fashioned gravity, or Daniels. There are many of them advertised, but few that come up to the claims made for them.

CONDENSATION HYGROMETERS.—A very interesting improvement in dew point hygrometers has been recently effected by Mons. Henri Gilbault. In order to fix with great precision the exact temperature of the condensing surface, he employs simply a sheet of glass coated with a thin layer of platinum. This platinum is the surface of condensation, and its temperature is indicated, within, it is stated, one-thirtieth of a degree, by a galvanometer which marks its electric conductivity.

ARTIFICIAL IVORY is now being manufactured from milk, by coagulating it as one would in making cheese, mixing the solid portion with borax, and subjecting the mass to high pressure. The resulting product, upon which the curious name of "lactis" has been bestowed, is said to be hard, durable and well suited for the manufacture of combs, billiard balls, penholders, pipe mouthpieces and so forth.

A NEW silver-plating process has been introduced in London in which the coating produced is only slightly tarnished by atmospheric influences, and is not easily affected with acids. The process is similar to the present methods except that a secret alloy is used.



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WHEN we have rehabilitated hydraulic mining, and it will be pouring, as aforesaid, its wealth into Marysville, restoring its prosperity and repeopling its waste places, then will our friend of the Farmer be in more amiable mood, and possibly cease his diatribes against the hydraulic miners altogether. Until then, this very able and otherwise estimable gentleman must be permitted to indulge his favorite pastime in peace.

THE number and the extreme fatality of the accidents occurring everywhere in the mines of late admonish to greater care on the part of those exposed to these dangers, both employers and workmen, many of these casualties being due to the carelessness or the imprudence of the latter.

THE BOOMING RIVERS.—The recent warm weather causing a rapid melting of the snow on the mountains, has caused a booming of the rivers, already pretty well filled by the heavy spring rains. The water supply, now ample for every use, will be likely to hold well into the summer.

MINING OPERATIONS are now being actively prosecuted along the main gold belt below the heavy snow line, the outlook being favorable for a good summer's work in our several gold mining fields.

OUTSIDE of California the resumption of mining operations has been somewhat delayed, owing to the past inclement winter, which, besides proving severe, has been unusually protracted.

Increased Demand for the Gold Mines of California,

But Sales Harder Than Ever to Effect.

The business of gold mining in California, everything considered, is in a more satisfactory condition at the present time than ever before, and that mainly because it is now being carried on more in conformity with the rules and requirements that govern the conduct of other leading industries. Owing to this fact and to the many improvements that have lately been made in the mechanisms and the metallurgy of the business, there is noticeable a growing disposition on the part of capitalists and others having money at their disposal to invest in this class of mines. This disposition is manifesting itself in various ways, chiefly in a greater inquiry for properties of this kind. The mine hunters and the mine viewers are abroad. They do not make themselves conspicuous on their travels, nor do they advertise their wants in the newspapers. Nevertheless there are scores of would-be investors and mining experts making a still hunt in California for gold-bearing deposits, both vein, hydraulic and drift.

Now, with such increased inquiry for our gold mines, it would naturally be inferred that sales of this class of properties could be effected more readily and with greater facility now than ever before; but such is not the case. Paradoxical as it may seem, the very reverse is true. Just in the proportion that the negotiator for a mine is anxious to get hold of it, he appears cautious and exacting. While such statement on the face of it looks absurd, it is nevertheless true, the explanation of such seeming contradiction being this:

Formerly, mines were, as a general rule, bought largely for speculative purposes—to be sold again at greatly advanced prices, or to be capitalized at enormous figures and the shares sold on the stock boards or peddled out to the credulous and easily gulled public. When, as in years past, this method of handling mines largely obtained, it mattered little to the buyer whether he paid a big or a small price for the property purchased, or whether, indeed, the latter possessed much or little value, inasmuch as it answered his purpose equally well, so the scheme was adroitly manipulated. And why should the buyer have higgled about the price of a mine or been particular about its merit, seeing these constituted then such unimportant factors of the transaction? And that he did not so higgled was to his credit as showing a willingness that the vender should participate, to some extent at least, in the benefits expected to be realized from the swindle.

At the present time these conditions are all changed; gold mines are not now being bought for stock jobbing or other illegitimate purpose. Buyers, at least in California, are for the most part seeking these properties as a permanent investment, their purpose being to hold and work them for the profit they may yield, the same as they would buy a stock ranch, a farm or a vineyard; but they know that mining is a more uncertain branch of business than either of these, and feel that they should, when about to engage in it, exercise a degree of caution proportioned to the uncertainties that attend it.

Not like the professional manipulator of stocks and promoter of sales do these men expect to derive revenues from cross deals, simulated sales in the stock boards, or other Peter Funk operations, but solely from the net earnings of the properties they purchase, and for which they exchange their hard-earned double eagles. They cannot, if they get pressed for funds, raise money by hypothecating stock, boosting the share market, or by recourse to other sharp proceeding. If short of cash, they must go down into their pockets for it, or borrow as best they can, until such time as the prod-

uct of their mine will suffice to relieve their financial stringency.

Because there has occurred an increased disposition to invest in our mines, let not the owners of these properties, or claim holders generally, beguile themselves into the belief that there is going to follow a boom in the business of selling mines. What has been said in this connection ought to prevent any notion of this kind from spreading abroad, and dispel the illusion if it have already obtained among the parties alluded to.

It will be observed that we do not allege that the gold mines in this State are being sold to a greater extent now than formerly; but simply that there is more attention being paid to this class of properties, and that with a view to buying and working them. As to effecting a sale, this, for the reasons mentioned, is more difficult now than ever before; nor is it at all probable that intending purchasers will hereafter relax anything of their vigilance or show themselves less exacting in their requirements, if, indeed, they do not become more critical and more guarded than heretofore.

As all this amounts to simply a manifestation of cold business sense, it is not to be deplored. Persisted in, it will ultimately work to the benefit of gold-mining, rescuing it from the hands of unprincipled adventurers, speculators and sharpers, and lifting it on a higher industrial plane than it has ever yet reached, or would be likely to do, if pursued in the slipshod, unbusinesslike manner that has heretofore marked its conduct.

And Silver—What of It?

It is singular that, for a matter of such far reaching and vital consequence, there can be found for the silver question no place in American politics—that is, party politics. As between the two leading parties in the country this cannot be made an issue for the reason that the adherents of these parties appear to be about equally divided for and against the free coinage of that metal, nor are they at all united as to what policy should be pursued in dealing with this difficult and vexatious problem; all of which illustrates how much easier it is to commit than correct an error, once we have fallen into one.

Prior to 1873, when silver was in this country being coined freely and circulating the same as gold, all went well. No complaints were heard, nor was any opposition made to this arrangement because there was no just grounds for any. For some unaccountable reason, unless, as seems probable, the movement was inspired by the creditor classes, the white metal was then demonetized by act of Congress. The passage of this law does not appear to have met with much resistance, either in or out of Congress, and that for the reason, no doubt, that its effect was not then foreseen or even apprehended. As a general thing it may be said that everybody acquiesced in it; certainly it met with no widely recognized or vigorous opposition.

In addition to the cause above alluded to, the greatly increased production of silver about that time may have had something to do with its demonetization. The Comstock mines had, ten years before, begun to turn out great quantities of silver, and were now threatening to largely increase their output. That this prospective increment of the white metal had something to do with its degradation may well be, the ostracizing of silver by England and Germany also tending to induce unfavorable legislation by our own Congress. Possibly, too, the financiers and the governors of the great fiscal institutions of the world, recalling how the discoveries of gold in California and Australia had tended to cheapen that metal, fearing a like result in the case of silver, determined on its dethronement before its purchasing power had been dangerously reduced.

Be that as it may, the baneful effects of this law began to make themselves manifest

soon after its enactment. Silver, before maintained on a parity with gold, began to depreciate, and, from that time till this, has constantly fluctuated in value, having not long since reached its minimum; the price being lower than ever before in the history of that metal. And so matters in this connection have been going from bad to worse until, at last, many of our large silver-producing companies have been forced to close their mines because of the depreciation of silver, this action having been induced hardly more by the present low price than the doubtful status of that metal in the future.

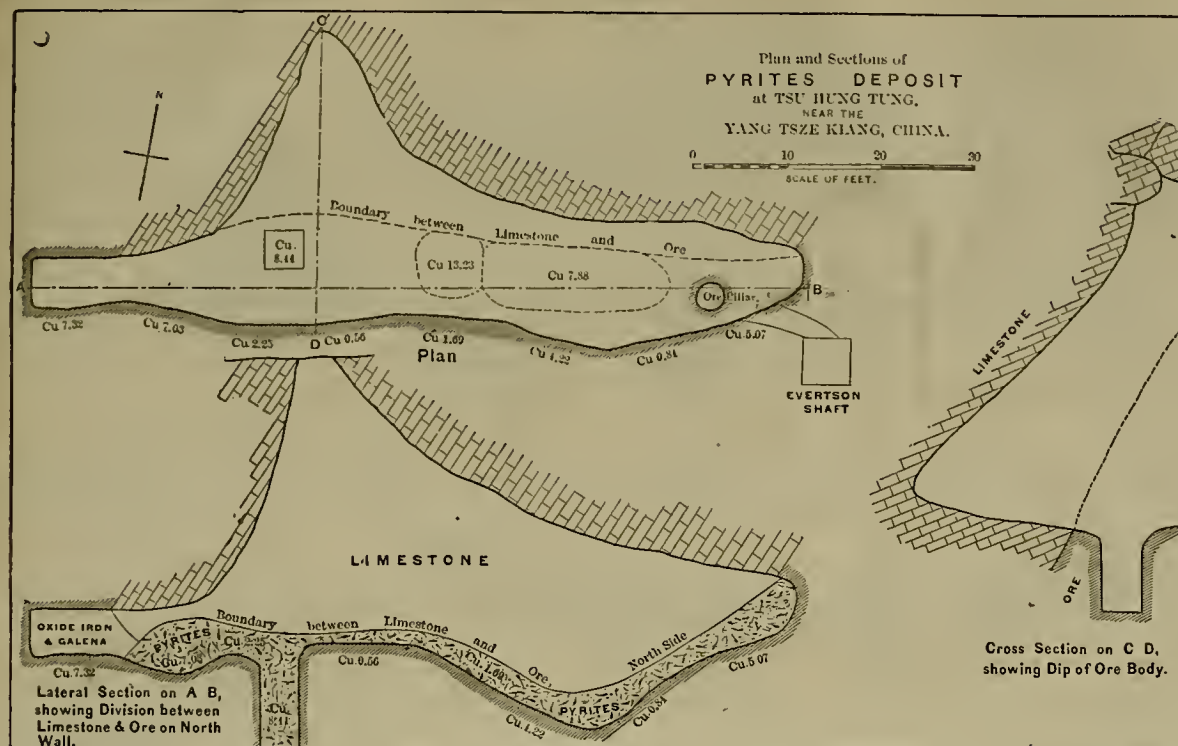
Such being the situation, it is pertinent, addressing our National Legislature, to ask, in the language of Boss Tweed, "What are you going to do about it?" We do not put this question to the members of that body in the expectation that they will be able to give us an intelligent answer, because clearly they don't know themselves what they are going to do, the situation being aggravated by the fact that we do not feel quite competent to advise them what they should or can do. This is a problem difficult of solution—a case in which doctors disagree, rendering it very dangerous for the patient.

One thing, however, may be said. The output of silver has not of late been increasing at anything like a perilous rate, nor is it likely to do so. The opponents of free coinage need have no apprehensions on that point. The increment of this metal has not, in fact, kept pace with that of the population, industries and general growth of the country. We need to enlarge our currency, and may safely proceed to do by the reinstatement of silver, there being no likelihood that it will ever reach undue proportions through overproduction. The annual coinage of the white metal does not reach one dollar per head of our population, nor will it, should we mint all the silver we ever produce, be likely to do so. Upon the whole, we think it would be safe and expedient to coin all the silver produced by our home mines, though possibly it might be good policy to induce other leading nations to come into an arrangement with us as to the relative value to be fixed upon for the two metals, before proceeding to do so.

TROUBLE AT COEUR D'ALENE.—For six months the mines of Coeur d'Alene, Idaho, have been closed on account of a strike of the carmen and shovelers, who wanted \$3.50 a day, the price paid to skilled miners. Both the Mine-owners' Association and the Miners' Union last month announced ultimatum, which were irreconcilable. May 1 was the date on which the time for arbitration ended. Now there are posted in all mining districts around Lake Michigan advertisements for miners for the Coeur d'Alene country. Two thousand are advertised for, but the Miners' Union, urged by the prospect of a perpetual freeze-out, have threatened to allow no nonunion man to work. Last week they drove two nonunion foremen out of the country. This week the Mine-owners' Association secured an injunction in the United States Court at Boise to prohibit the Miners' Union from offering interference. Fifty Deputy United States Marshals have gone to the mines.

THE CHICK PROCESS.—Should this paragraph meet the eye of any one having a knowledge of the so-called chick process, in use at Redding, Shasta county, several years ago, we would be glad for some information in regard to the same—what it consisted of, how operated, etc., as full a description of the process, in fact, as can be conveniently given.

THE visit of the editors to California has called away Mr. A. T. Dewey to assist in entertaining them. Therefore, his promised letter on the Sunset Oil Works must be deferred until another number of the PRESS.



Progress of Mining in China.

Within the last ten years, the progressive party in China has been making great efforts to develop the mining resources of the country—coal, gold, silver, copper and lead. In the Chi-Chao district, some 300 miles up the Yang Tze river, several deposits are worked, the principal of which is the Tsu-Hung-Tung pyrites deposit, the Nao-Lung-Ching hematite deposit, and the lead-zinc vein at Tung-Chi-Lung. Mr. Ellis Clark of Philadelphia read a paper before the American Institute of Mining Engineers, in which he described the mines being worked by the Chinese companies.

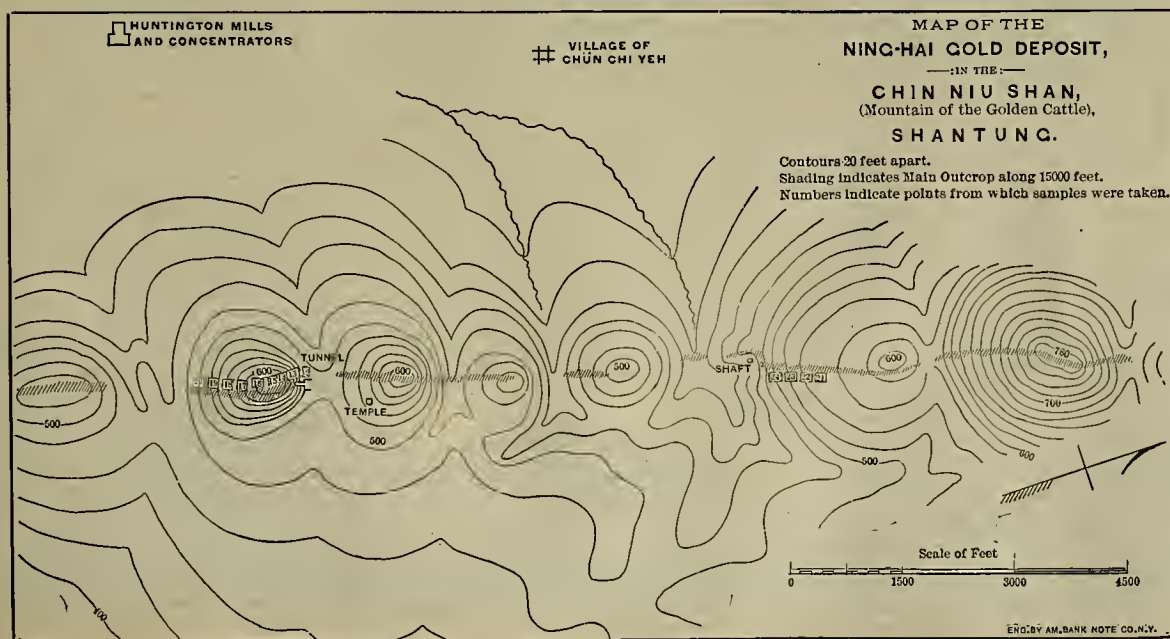
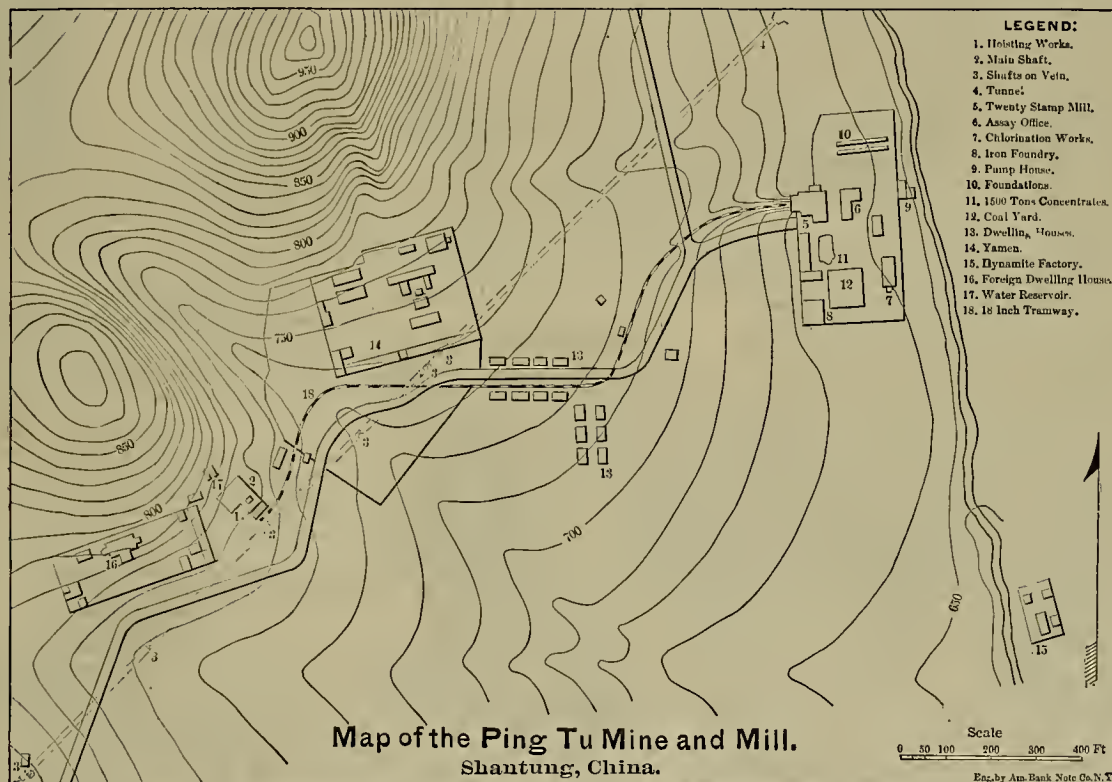
The first of the Tsu-Hung-Tung deposits (see figures) is the most interesting of the series, and consists of a lenticular deposit of copper and iron pyrites, oxide of iron and a little galena, developed to a length of 80 feet, a thickness of 5 to 12 feet, and a depth of 40 feet.

At the time of the writer's visit no copper in quantity had ever been made from the ore, the opening having been made years before for the purpose of distilling sulphur from the pyrites. Some ore was then shipped to the sulphuric acid works of Major Brothers, limited, at Shanghai, the acid works at Luo-Pao-Chi having ceased operations, but after an extended trial it was found that the ore contained too much arsenic for the profitable manufacture of sulphuric acid. The Evertson shaft, shown at the eastern end of the working, has been sunk under and parallel to the vein; it is 70 feet deep and terminates in a rich brown oxide of iron containing traces only of copper.

The iron deposit of Nao-Lung-Ching is about two miles northwest of Tsu-Hung-Tung. The ore consists of hematite which has been probably derived from pyrites, as specks of this material can be seen by careful inspection. The deposit has been opened by four superficial shafts at distances of 75 feet, and although the growth of weeds and creepers prevent the exact location of boundaries from being ascertained, it is probably 400 feet long, with a width of 30 feet. The sulphur in this ore will probably prevent its use for the manufacture of iron.

Tung-Chi-Lung.—The lead-zinc opening of the Tung-Chi-Lung is situated 27 miles southeast of Tsu-Hung-Tung. It consists of a heavily mineralized fissure vein between blue-gray slate walls, having an east and west strike and an almost perpendicular dip. In the shaft, which at the time of the writer's visit was 11 feet deep, the footwall was shown, but the hanging-wall had not been cut. Resting on the footwall are 1 foot 6 inches of zinc blende and gangue, followed by 2 feet of copper and iron pyrites and blende, and 4 feet of galena, blende and gangue. An average sample across the vein gave 3.6 per cent lead and 1 ounce of silver per ton. A sample of galena and blende taken from a pile of 10 tons gave 18.5 per cent lead and 6 ounces of silver.

The Ning-Hai gold district lies 30 miles southeast of the treaty port of Chifu. Supplies and heavy articles are taken to the mines from the steamer anchorage near Ning-Hai City, 15 miles distant. The geological formation of the district consists of granite, gneiss and mica slates, with occasional interbedded deposits of white crystalline marble and extensive quartzite ledges, which mark out some of the most prominent topographical features of the country. Such a ledge forms the backbone of the Chin-Niu-Shan, or Mountain of the Golden Cattle, which is about 15,000 feet long. By reference to the map, it will be seen that this quartz ledge rises out of a plain to the south 400 feet above sea level, and forms a series of cone-shaped hills whose summits reach an elevation of 500 to 800 feet above the sea, while the gorges between them cut down nearly to the level of the plain. A tunnel has been opened on the ledge at the point shown on the map. Its course is



south for 200 feet, cutting through the quartz ledges, of which there are two at this point, and through the interlying granite and white kaolin selvages. The vein quartz is hard, and white to yellow in color. The sulphurets it contains are sometimes cubical crystals of pyrites and sometimes massive, forming pockets in the quartz. In its length the ledge shows a thickness varying from 10 to 80 feet. It is gold-bearing along its entire outcrop.

Besides the tunnel, extensive prospecting has been done along the whole length of the ledge, both recently under European direction and by the Chinese in olden times. The writer took and assayed 25 samples from this large deposit, which ran from 77 cents to \$5.85 per ton. One assay of selected quartz from a pocket gave \$24.75. The average of ten samples from the tunnel is \$1.55; the average of 13 samples from the outcrop is \$2.19; and the general average of all the samples is \$1.87 per ton, which is too low to warrant the erection of any but experimental works. The plant on the ground consists of two three-foot Huntington mills and two Frue vanners.

The Ping-Tu Gold District.—The Ping-Tu group of mines is situated in the western part of the Shantung promontory, 30 miles from a steamer anchorage and 45 miles southwest of the Chao-Yuen group of mines. The immediate geological formation is gneiss, which, at a distance of 10 miles north and south of Ping-Tu, is cut by zones of highly metamorphosed limestone. The local topography is shown in the figure. The two hills which rise to the height of 220 feet above the shaft house are composed of distinctly bedded yellowish gneiss, striking east and west, and intersecting the course of the vein, which is northeast and southwest. This leads to the belief that the Ping-Tu deposit is a true fissure vein, one of the few that occur in Eastern China, and this theory receives further support from finding breccia in the vein matter.

The mines have been worked by the Chinese for a number of years. Under European auspices and the superintendence of Mr. H. M. Beecher of England, the systematic development of the mine at Ping-Tu was begun in 1886, and a 20-stamp mill, made by the Union Iron Works of San Francisco, with eight Frue vanners and eight Hendy concentrators, was erected. After the mill was in operation, the hoisting arrangements were found inadequate to keep it supplied with ore, and a new fifty-thousand-dollar hoisting plant, with Ingersoll rock drills, was erected under the superintendence of Colonel Ellsworth of San Francisco.

The upper portion of the vein was quite rich. The writer was informed that the first clean-up amounted to \$10,000. When in full operation the mine had a staff of 12 Americans, a very large Chinese clerical force, with its numerous servants, and the usual crowded labor underground and on the surface. As the mine increased in depth, the ore carried less free gold and more sulphurets, and the amount of amalgam that could be scraped from the plates rapidly decreased. The foreign employers, always more or less dissatisfied with the unprofitable mine, gradually left, and their places were filled with Chinese, who had but imperfect knowledge of amalgamation and the general working of a stamp mill. In the fall of 1889 supplies fell short, and, with the failure to receive coal, the mine pumps were stopped and the workings allowed to fill with water.

THE Souvenir Badge for the members of the National Editor's Association has been manufactured by Col. A. Andrews from gold, silver and tin, products of the mines of California. The medal proper, which is of tin from the Temescal mines, is just the size of a silver half-dollar piece, but somewhat thicker. It is suspended from a silver bar pin by two short chains of silver

beads. The silver bar, which is of satin finish, bears the letters "N. E. A." On the obverse of the medal the emblem of California appears in the shape of a small bear made of solid gold, and riveted to the medal with concealed rivets. Above the bear is the word "California," and beneath it the figures "1892." The reverse of the medal bears the legend in raised letters, "Gold, silver & tin products of California."

The Cyanide Process.

A Believer in the Old Style.

TO THE EDITOR:—I have been hearing a lot of late about that new cyanide process for working ores. Now I don't often turn myself loose with a pen. I do most of my scribbling on the rocks with pick, gad and drill, but I've had a good deal to do with mills, too, worked my own ores and had them worked for me, and I think I know what's what about as well as the rest. So I thought for once I'd let the public know what a practical man thinks about this new dodge. I've paid a good deal of attention to the new processes that have been cracked up, one after another, in the last 25 or 30 years, and I notice that no patent or secret process has ever amounted to anything for the miner. California is spotted with the wrecks of crank mills and processes that were going to revolutionize the business—going to but didn't.

The fact is, these patent processes are like peddlers' razors—made to sell, not to be used. They are gotten up to put money in the pockets of inventors, and still more of promoters. When they show me an honest miner who has got rich through this cyanide process, I may take some stock in it. Until then, I for one will stand by the good old way—stamps, copper plates and concentrators, and the chlorine process for the sulphurets. These are old and tried things and no patent process about them, only some of the machinery has patent improvements which any man can see and understand.

In that way an honest miner can take his ore to the mill and have it worked in short order, and see the work done if he wants to, and if he takes his horn spoon and tries the tailings, he can see right away if they are not saving his gold and sulphurets.

I know they pretend that we lose a whole lot of gold that way, but, as I put it up, that's mostly talk to help sell the patent process. I don't take any stock in assays of gold rock, and it's gold rock I am talking about. I know nothing about silver ores. The best assay is one that the miner can make with his horn spoon, and then run a few tons through the mill and see how it cleans up. That's the way the miners have made a living, and sometimes a little more, not by patent processes.

I hear that Almarin B. Paul has taken a great fancy to this cyanide process. Well, that's not surprising; he's built that way. Paul is a gentleman, and well spoken of personally, but he's a crank from way back on process. For years Mr. Paul has been setting up for a prophet on gold milling, but some of us think he's been more of a loss than a profit to himself or anybody else. There's his dry amalgamating process! Who but himself would ever use it? And his Americanized arrastre, too! How much better is it than the old stone arrastre that a man can build for himself and not have a big bill at the foundry? But it seems he got tired of those, gave up inventing things that he couldn't sell, because nobody would take them as a gift, went back to his home-made idols, and is now groveling at the feet of this foreign fetish.

A year ago Paul wouldn't have a piece of cyanide as big as a walnut within a mile of his mill if he could help it, and now he's up to his neck in the stuff. They tell me he eats it on his beefsteak instead of salt. Now Cyanide is just like a horse's tail, a good thing in its place; that is, for cleaning the plates and in the clean-up barrel, and that's all it's good for in a gold mill.

I hear it takes a week or two to work a tubful of ore by this process, for they put it in a great tub and pour the medicine on it, and let the stuff leak through, then pour it on again, and so on. Well, they say the constant dropping of water will wear away a stone, and so I suppose they can wear the gold out by keeping at it long enough.

But fancy a miner going to the mill with his little dab of rock, say ten tons, and having to wait the best part of a month for his returns, with no other amusement than watching a little bit of a stream of water running from a faucet! Or, if he takes a look at the laboratory—for, mind you, the horn spoon isn't in it with these hifaluting

patent processes—he sees a slim young gentleman from the university, or an old fool with a big pair of specs on him to make him look wise. The learned gentleman pours some stuff out of a bottle into some sort of a glass thingumbob with a faucet to it, runs it into another glass jigger, takes it up and looks at it mighty wiselike, and then throws it away; and they call that science, or chemistry, or what not. Why, a live American miner would gape his head off waiting for them—or else go and get blazing drunk.

I've no doubt Mr. Paul knows which side of his bread is buttered. He has rights to sell, and of course he wants to sell them; but, in the meantime, what kind of a show does he give the miner? He has got a custom mill, and Mr. O. H. Aaron, who is a bit of a crank himself, I believe, is stuck on the new process, too, though pretty careful about shooting his mouth off, has shown me his scale of prices. Mr. Paul claims that it only costs about \$150 per ton to work ore to 95 per cent or more by the new process, yet, allowing that he gets out only 95 per cent, he takes toll at the rate of \$31.50 per ton for \$150 ore and \$8.25 per ton for \$15 ore! I call that advertising his wares through the miners, and making them pay him pretty well for doing it.

As I said before, I don't know how it may be in silver, but, outside of the chlorine process, which is an old thing, I don't see that assayers and chemists and scientific smarties, generally, have ever done any good for gold-milling, no more than geologists and mineralogists and all the other ologists have for gold-mining. These latter gentry can tell us all about a mine after the miner has dug holes all through it, but they can't tell the miner where to dig a hole to find pay-rock.

By the way, how is it the State Mining Bureau has not told us about this new process? If there's anything in the thing, as Paul and the rest of them pretend, I think the Bureau would know, and would let us know, all about it; that's what we keep it for, I guess.

Well, I reckon this letter is long enough, too long maybe, but I don't trouble you very often. Perhaps I'm too old to catch on to new things easily; but be that as it may, the old stamp mill and quick is good enough for, yours truly,

A PRACTICAL MINER.

Arizona Onyx.

Arizona Onyx is fast gaining a reputation in the East, and the day is not far distant when most of the onyx used in the United States will come from this Territory. The great beds of this precious stone in Yavapai and Maricopa counties alone, when sufficiently developed, will supply a greater part of the demand. Even now from two to five carloads are shipped from the Yavapai beds, and arrangements are being made to increase the output, and by the 5th of May teams will be moving several tons a day from the Cave Creek mines.

The Yavapai onyx beds, owned by W. O. O'Neil and partners, are probably the most extensive mines of the kind known, being almost a solid body one mile by one mile and a half in extent. At present about 40 men are engaged in taking out the stone, that is being shipped to Chicago, New York, Cincinnati and other Eastern cities, where it is worked into table tops, etc. Probably the largest slab of onyx ever taken out in one piece was dug out of the O'Neil ledge, it being 23x10 feet, and 26 inches thick. The stone from this claim is very fine grain and takes a much higher polish than the celebrated onyx of Mexico, and it contains colors that were exhausted many years ago in the Mexican mines. Then too, the mines of that country never turned out pieces larger than five or six feet square. So far as developed, the Cave Creek onyx beds do not seem to be as large as the Yavapai beds, though the stone is as fine, but even as they are, they will produce large amounts and in blocks of very satisfactory size. J. B. Dougherty, of New York, is doing a great deal of development work, and as soon as the road is completed, which will be in a few days, he will put teams to hauling and loading it on to the cars at Phenix, for shipment to New York.—Phenix Gazette.

Complimentary Samples.

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The Rolling of Ships.

One fact that often strikes the thoughtful traveler by sea is that, notwithstanding the great and numerous improvements of recent years which have made life on shipboard pleasant and luxurious, little or nothing has been done to steady a vessel when she meets with waves that set her rolling heavily from side to side. The tendency seems to be rather in the direction of increased than of diminished rolling, for the steadying influence of sails, which makes the motion so easy and agreeable in a sailing ship, is fast disappearing in large steamers. Masts and sails add appreciably to the resistance of large, fast steamers; so they have been cut down in size year by year till such fragments of sail as still remain are so small compared with the size of the ship as to retain little power to reduce rolling.

Mr. Thornycroft, the English builder of torpedo boats, boilers, etc., has devised a means of checking rolling by moving a weight, under strict control, from side to side of a vessel so as to continuously balance, or subtract from, the heeling moment of the wave slope. It consists of a large mass of iron in the form of a quadrant of a circle, which is placed horizontally, with the center on the middle line of the vessel, and there connected with a vertical shaft. The shaft is turned by a hydraulic engine, which is very ingeniously controlled by an automatic arrangement. The heavy iron quadrant is swept round from side to side, revolving about its center, to the extent that is required to counteract the heeling moment. In a paper read before the Institution of Naval Architects, Mr. Thornycroft said:

"The manner in which the controlling gear works will be better understood if we imagine a vessel remaining upright among waves, while near the center of gravity of the ship we place a short-period pendulum suspended so as to move with little friction. This will follow the change in the apparent direction of gravity without appreciable loss of time, so that any change in the wave angle and apparent direction of gravity cannot take place without due warning, which will indicate the time and amount of the disturbance. It is therefore only necessary to make the motion of the ballast bear some particular and constant ratio to the motion of this short-period pendulum to keep the balance true. The inertia of a heavy mass will cause some loss of time, as we can only use a limited force for its control; but it is possible to accelerate the phase of motion and overcome this difficulty so far as to get good results.

"If, now, we imagine the ship to roll in still water, the effect of the combination just described will be to balance the ship's stability for a limited angle; but this defect is removed by the introduction of a second pendulum of long period, which tends to move the ballast in the opposite direction to the first one, and enables the apparatus to discriminate between the angular motion of the water and that of the vessel.

"I find, however, that the long period pendulum is rather a delicate instrument, and that its function can be served by a cataract arranged so as to always slowly return the ballast to the center, and this device has the effect of accelerating the phase of motion, which, in some cases, we also require.

"We are therefore able, by very simple parts, to construct an apparatus which will indicate the direction and amount of motion necessary to be given to the ballast at a particular time so as to resist the wave effort. This power of indicating may be converted into one of controlling by suitable mechanism. The loss of time due to inertia of the necessary ballast is not always unfavorable when the apparatus has to extinguish rolling motion, the greatest effect being obtained when the ballast crosses the center line of the ship at a time when it is most inclined to the water surface, and this corresponds to a quarter of the phase behind the motion of the short pendulum."

The apparatus has been working for some time in the steam yacht *Cecile* with very good results. What the objections may be to applying it to the largest passenger steamers remains to be seen. A moving weight of something like 100 or 150 tons would probably be required in such vessels. The power necessary to control the movement of the weight appears to be small, and Mr. Thornycroft's invention seems at any rate to show the way toward obtaining the long-desired boon of substantially reducing, if not checking altogether, the rolling of ships. If it succeed in doing upon a large scale only a portion of what is claimed for it in the way of anticipating and counteracting the heeling effect of waves, without the possibility of acting in an erratic or undesirable way, we may hope to see it adopted some day in passenger steamers.

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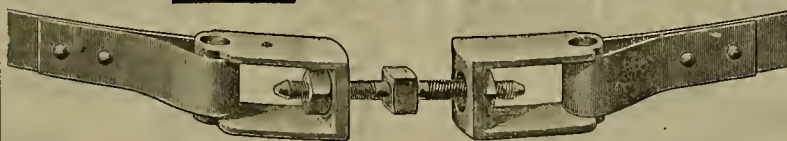
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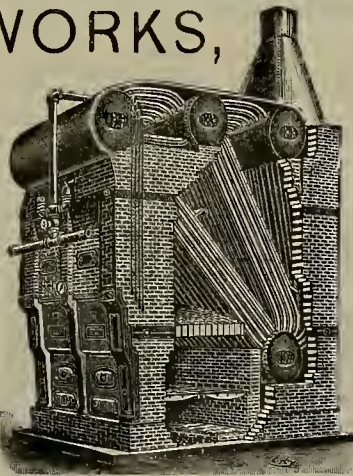
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The Engineers' Visit.

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When the members of the American Society of Mechanical Engineers, who are visiting California, came out of the snow-sheds on the western slope of the Sierra, they were met by a committee of ladies and gentlemen from Sacramento and San Francisco and given an abundant supply of flowers and fruit. Mr. H. J. Small, Supt. of Motive Power and Machinery S. P. R., one of the local committee, had made all the arrangements, and they were well carried out. The party from here consisted of Mr. and Mrs. Eckart, Mr. and Mrs. Robert S. Moore, Mr. and Mrs. Geo. W. Dickie, Mr. and Mrs. John Richards, and Mr. and Mrs. Marsden Manson. On arriving at Cape Horn, the train was stopped and the visitors given time to enjoy the view. From there on to Sacramento the ride was thoroughly enjoyed by all. The ladies were especially pleased that a ladies' committee had taken the trouble to come up the road to meet them.

At Sacramento, Mr. Small showed the visitors the railroad shops, and the various points of interest in the city. That night the party went on to Monterey, the escort committee accompanying them. They remained at Monterey Saturday and Sunday, Mr. E. J. Molera representing the local committee, assisting in their entertainment.

On the way to San Francisco on Monday morning, the party stopped at the Stanford University, where Prof. Horace B. Gale escorted them and showed them the buildings and grounds.

The party arrived in San Francisco somewhat later than was expected, and the reception set at 2 p. m. did not come off until 3.30. Mayor George H. Sanderson welcomed the guests on behalf of the city, and ex-President W. R. Hunt, responded.

The reception was of an informal character throughout. On its conclusion, the committee of which A. S. Hallidie was chairman took the guests to the engine-houses of the principal cable roads of the city, where they saw much of interest.

In the evening, the opening session of the society was held at Academy of Sciences hall. The following professional papers were read:

John Richards—"Notes on a Problem in Water Power."

John H. Cooper—"A Self-lubricating Fiber-graphite for the Bearings of Machinery."

Harris Tabor—"Machine Moulding."

O. H. Manning—"A Novel Flywheel."

W. W. Christie—"An Experiment with Aluminum."

On Tuesday morning bright and early, all lands assembled at Washington street wharf for a trip around the bay on the tug Fearless, which had been placed at the disposal of the local committee by J. D. Spreckles Bros.

The weather was delightful and everybody pleased. They went out through the Golden Gate on to the Pacific, but a few rolling swells admonished the committee that the ladies preferred smooth water. The tug turned and passed up through Raccoon Straits to San Pablo Bay and to Mare Island Navy Yard. At Mare Island the visitors were received by Commodore John Irwin, Chief Engineers Moore and Burnett, Naval Constructor J. H. Linnard, Captain of the Yard J. C. Watson, and Lieutenant Le Favor. The foundry, machine shops and construction departments were visited, when the ladies expressed a unanimous desire to see the flowers and shrubbery in the officers' quarters. A botanical expedition was then extemporized with results calling forth the delight and admiration of the Easterners over California's floral possibilities. Visits were then paid by separate parties to the United States ships Boston and Independence and the dry docks.

On the return to the tug, a fine lunch was found ready spread under the awning. Mr. N. W. Spaulding had made all the arrangements for this very carefully, and it reflected credit on his skill as caterer. The trip back to the city was made in a couple of hours.

At a few minutes past 8 p. m. there was a general gathering of members for the evening session in the hall of the Academy of Sciences.

George I. Alden of Worcester, Mass., having taken the chair, the following papers were read by the secretary, F. R. Hutton, in the absence of the authors: "The Density of Water at Different Temperatures," by A. F. Nagle; "Economy and Efficiency of the Steam Engine," by C. H. Peabody; "Some Tests of a Portable Boiler," by W. O. Weber. Albert W. Stahl of the United States navy, stationed in San Francisco, then read

a very clever paper on "Utilization of the Power of Ocean Waves." The paper drew forth a great deal of discussion from various members. Mr. Stahl met all objections in a very able manner, and, having carefully reminded his audience that he was not yet prepared to prove his ingenious invention a commercial success, pointed out that his paper was merely to show what he deemed the best machine for utilizing ocean wave power, as invented to date. The paper was deservedly applauded.

The chairman announced that owing to the extensive program of sight-seeing arranged for, papers set for the next afternoon would be read during the session then being held. The secretary accordingly read the following papers: "The Electric Railway as Applied to Steam Roads," by B. J. Dashiell, Jr.; "An Experimental Locomotive," by W. F. M. Goss. F. M. Rites read his own paper on "The Steam Distribution in a Single-Acting Compound Engine."

The secretary having read a paper "On Compounding Centrifugal and Load Governing by a Rotary Piston Valve," by W. S. Aldrich, the proceedings were brought to a close.

On Wednesday at the invitation of the Spring Valley Water Company, the visiting Mechanical Engineers assembled at the Third and Townsend-street depot at 9 o'clock. A special train was waiting to convey the party, under charge of Charles Webb Howard, president, and Herman Schussler, chief engineer of the company. Some of them were late and had to come on a subsequent train. Arriving at San Mateo the party was promptly distributed in four four-horse coaches and six pair-horse express wagons. The cavalcade then wound in procession through the Howard, Hayward, and Parrott domains, and it would be difficult to say which of these lovely grounds called forth the greatest admiration for loveliness and luxuriance of well tended flowers and vegetation. A long and charming drive through the rich, luxuriant shades of the Pescadero road brought the party to the Upper Crystal Springs Reservoir. Here a temporary halt was called while Mr. Schussler handed round maps of the country and explained the day's route.

Remounting the carriages the procession drove round the reservoir to the big dam, where everyone dismounted and listened to the constructor, Herman Schussler, describe in detail the building of the biggest concrete dam in the United States. Driving on ten miles further on the homeward route the whole procession wheeled in under a big bay tree and dismounted to take seats at long tables covered with enough good things to supply three times the 100 guests assembled.

The Californians welcomed the Eastern visitors and the Eastern visitors dilated upon the enterprise of the Spring Valley Water Works and the hospitality of Californians generally. Charles Webb Howard welcomed the guests. W. R. Hunt replied. Others speeches followed from Frank M. Pixley, A. Sntro, J. T. Boyd, Professor George Davidson, Chief Engineer Moore, U. S. N., and Messrs. Herring, Hutton, Schussler, Yale, Dickie, Hallidie, Kirshaw, Colonel Shafter, J. B. Stetson and one or two others. After a three hours pause over the lunch tables the party remounted and drove homeward to meet their special train.

The cars were sidetracked into the Crystal Springs pumping station yard, where the machine-rooms were inspected and admired, and the big pumps built by the Risdon Iron Works were carefully examined. The trains arrived in San Francisco at 6.30. At 8 p. m. the society convened as usual for their evening session in the Academy of Sciences, Professor G. I. Alden in the chair.

Secretary Hutton read the following papers: On "The Measurement of Power" and "Diagramming Apparatus for the Testing of Materials," by T. Gray; "Two Cylinders versus Multicylinder Engines," by Green and Rockwood. Professor Jacobus read papers on "The Elastic Curve and Treatment of Structural Steel," by G. O. Henning, and "Summary of Results of Principal Experimental Measurements of Performance of Refrigerator Machines," by Denton and Jacobus.

The secretary then read committee reports on "A Standard Method of Testing the Efficiency of Locomotives" and "A Standard for Testing Flanges, Valves and Pumps."

A letter was read from Past President Professor Thurston, suggesting subscriptions from the engineering world toward a fund for the erection of a monument at Colmar, in Alsace, to the memory of the eminent French engineer G. A. Hirn, professor in thermo-dynamics. This wound up the evening session.

Thursday morning early the party went,

on invitation of Adolph Sutro, Esq., to the Cliff House and Sutro Heights. They returned through the Park in carriages, driving from there to the Union Iron Works and Pacific Rolling Mills, where the afternoon was spent.

In the evening lantern slides, illustrating the mechanical progress of California, were described W. R. Eckart, and a reception tendered by Mrs. A. S. Hallidie at her residence occupied the rest of the evening.

On Friday the ladies lunched with Mrs. James Spiers at Berkeley, and drove about that town, Oakland and surroundings, while the gentlemen visited various shops in the city.

The local committee in charge of the arrangements here, was composed of W. R. Eckart, George W. Dickie, of the Union Iron Works, James Spiers, of the Fulton Iron Works, John Richards, editor of the *Industry*, Marsden Manson, engineer of the Harbor Commissioners, E. J. Molera, H. J. Small, Supt. Motive Power and Machinery, S. P. R., Frank Van Vleck, Pacific Railway Co. of Los Angeles, Robert S. Moore, of Risdon Iron Works, and C. G. Yale, editor of the *MINING AND SCIENTIFIC PRESS*.

The ladies' committee consisted of Mrs. A. S. Hallidie, Mrs. W. R. Eckert, Mrs. James Spiers, Mrs. Robert Moore, Mrs. George Dickie, Mrs. Von Geldern, Mrs. Manson and Mrs. Richards.

Taken altogether, the visit of the engineers has been very much enjoyed by them, as well as by the local mechanical engineers. The arrangements were all carried out satisfactorily. All the gentlemen interested lent their aid in every way and greatly assisted the local Executive Committee.

The First Foundry in Chicago, And Also the First One in California.

Howard Louis Conard, in the *Magazine of Western History*, says that the first iron foundry located in Chicago was established and operated by William H. Stow, who became identified with the town in 1834 and resided there continuously up to the date of his death, August 18, 1881. He was born in Log City, now known as Hamilton, New York State, in 1809. At a somewhat early age he went to Syracuse, N. Y., where he served his apprenticeship in an iron foundry and became a molder by trade. From Syracuse he went to Buffalo, where he worked some time at his trade, and there heard of Chicago as a promising Western townsite.

In 1834 he visited the town of which he had heard such flattering reports, secured such assistance as he needed to enable him to engage in his contemplated enterprise, and made provision for the establishment of what was looked upon in those days as an extensive manufacturing plant. This foundry was located on Polk street, near the river, and was operated by the firm of William Stow & Co. The motive power was what was known as the Avery rotary engine, brought from Syracuse, and the first steam engines manufactured in Chicago were made at the Stow foundry, William Avery coming on from New York to superintend their construction. Threshing machines, plows, steam drills and pumps, such as were in demand for use in the construction of the Illinois and Michigan canal, and all kinds of castings were manufactured at this pioneer foundry, which, after being operated for several years on Polk street, was removed to the corner of Randolph and Canal streets.

In this connection it is of interest to note the fact that the pioneer foundry of Chicago was also the pioneer foundry of the Pacific coast. About the year 1845, perhaps 1846, the foundry passed into the hands of Henry M. Stow, a brother of William H. Stow, who in 1849 put all the machinery, fixtures, tools, etc., and all the pig and wrought iron and coal in stock at the time, on board a vessel purchased and loaded by R. K. Swift of Chicago with provisions and supplies of various kinds, which he proposed to ship to California.

The foundry was shipped as ballast, and was nearly a year reaching its destination, the vessel on which it was shipped having passed into the Atlantic ocean by way of the lakes, the Welland canal, and the St. Lawrence river, and reached San Francisco after sailing out to the Azores, through the Straits of Magellan, and over a long stretch of the Pacific ocean. In 1850 Henry M. Stow landed it on the beach at San Francisco, the cost of moving it a distance of 600 feet being precisely ten times as much as the cost of shipping it from Chicago to that point. In May of that year it was removed to Sacramento, Cal., where it was again put in operation. The proprietors of the foundry there were H. M. Stow and H. A. Bigelow, who was elected first mayor of Sacramento. It was located at the junction of the Sacramento and American rivers, and made the first

castings manufactured in California, the price which they brought at that time being \$2.50 per pound. The price of castings in Chicago at the same time probably ranged from 2 to 3 cents per pound, so that the earning capacity of the old foundry cannot be said to have been diminished by its removal to the Pacific slope, although the wages paid to employees—an ounce of gold, or \$16, per day to each man—had a tendency to keep down the profits. This historic foundry was operated up to 1864, when the price of castings dropped to 25c. per pound, and manufacturing them at this figure being considered unprofitable, the enterprise was abandoned.

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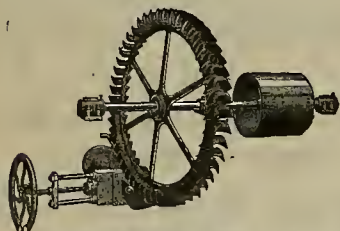
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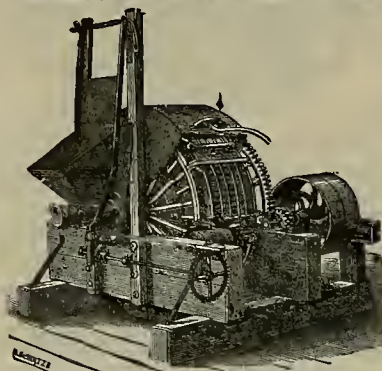
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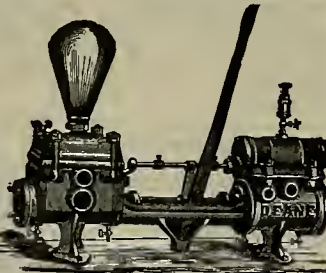
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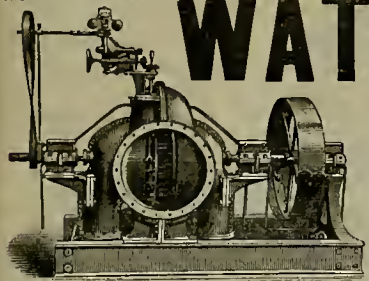
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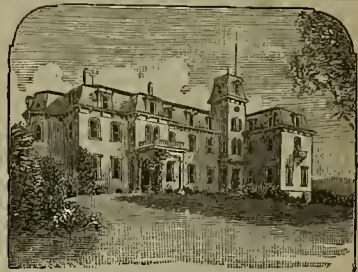
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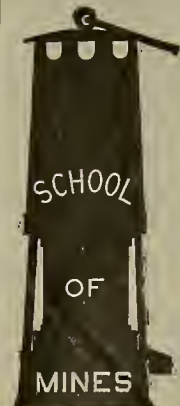
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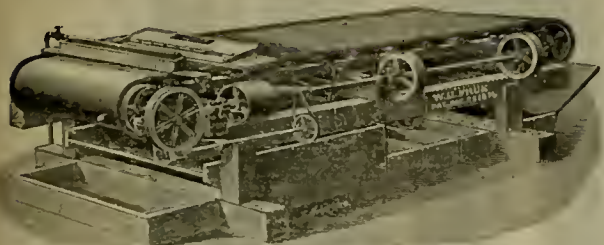
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C. J. CLARK, Conl. Supt.

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The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.



(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

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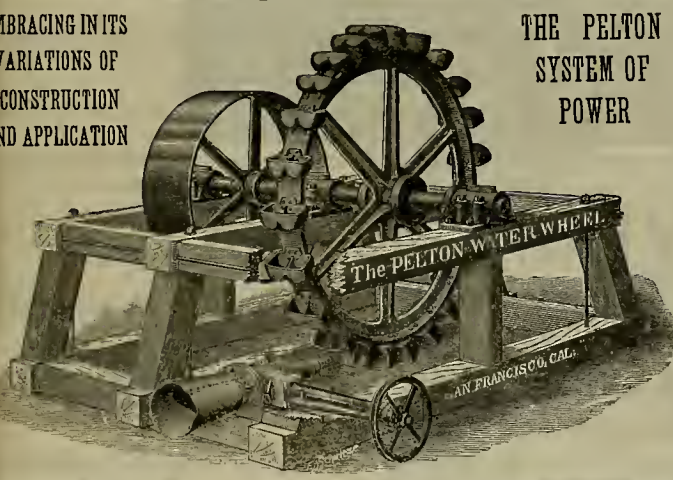
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Supt. North Star and Original Empire Mining Co.
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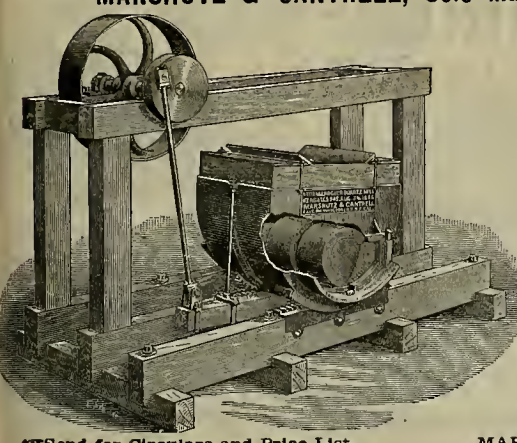
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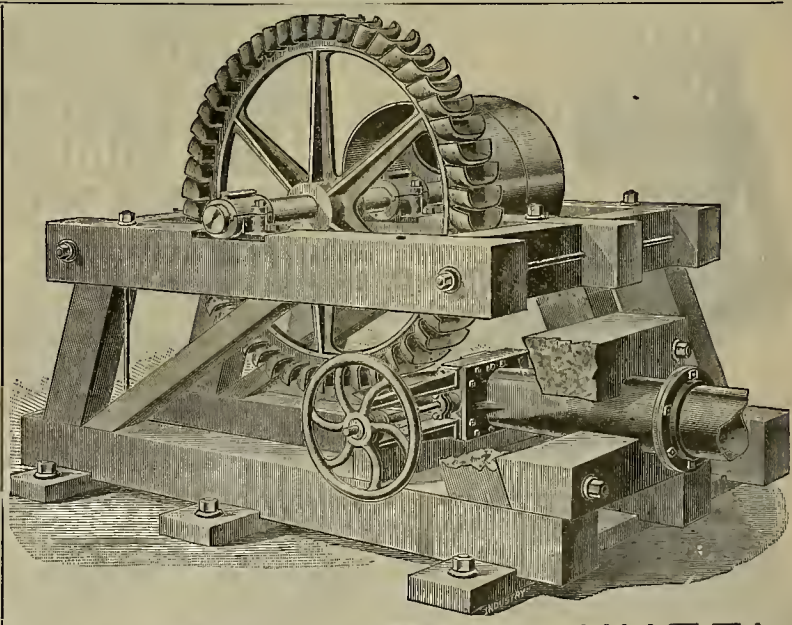
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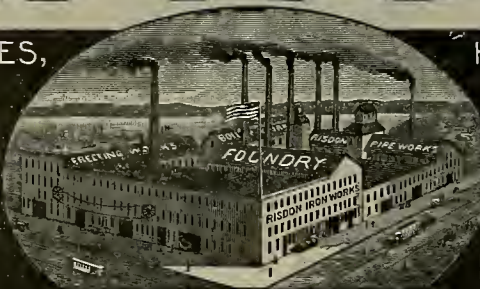
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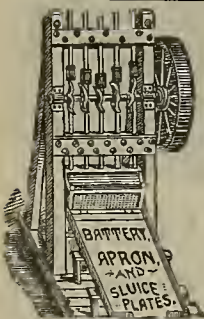
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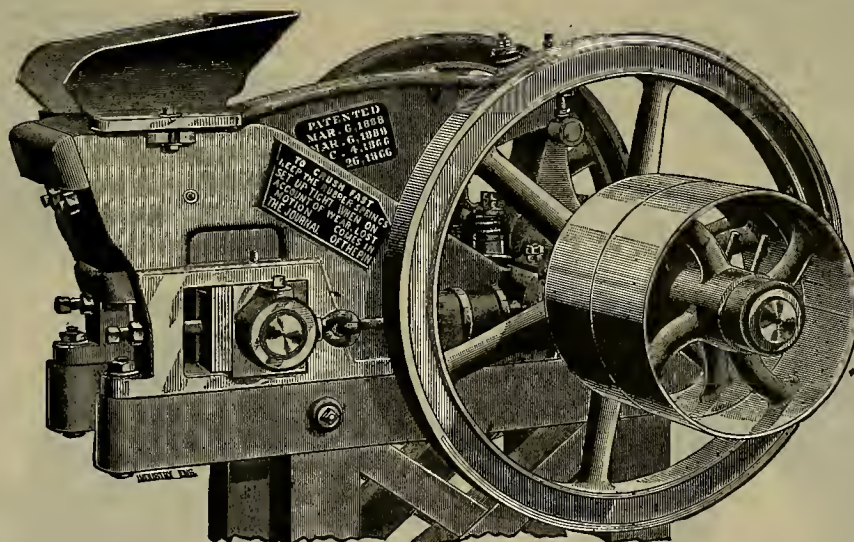
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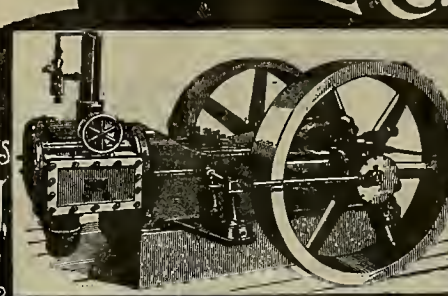
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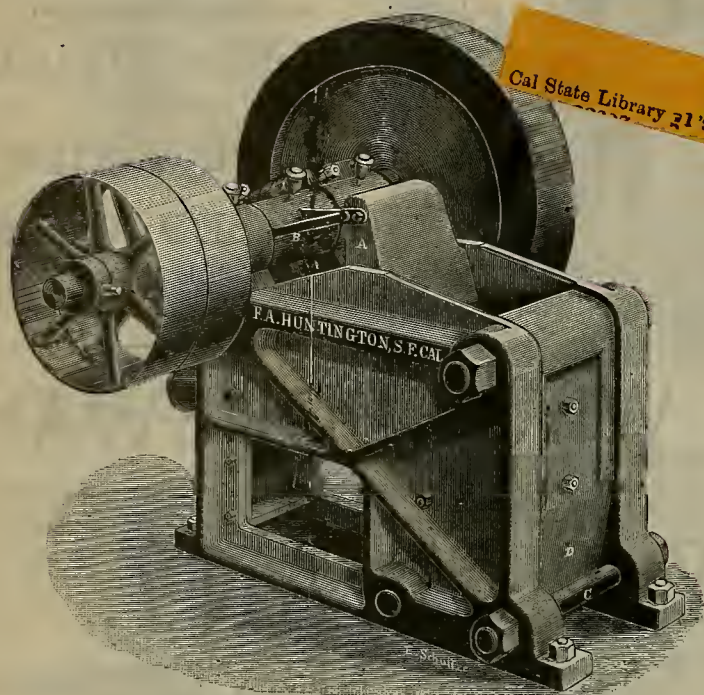
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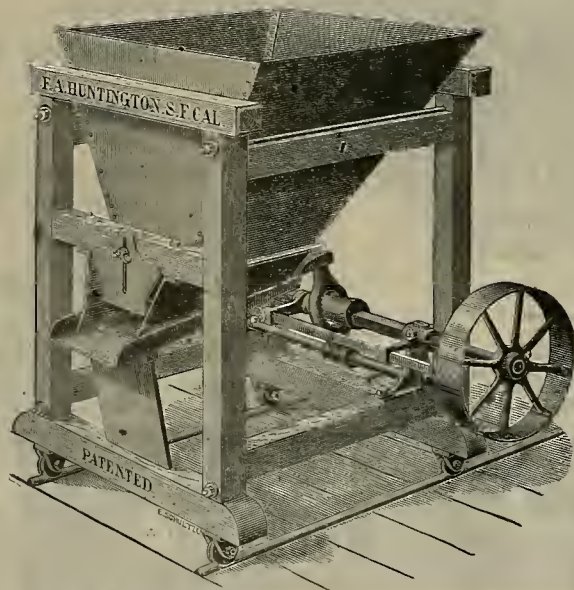
MINING MACHINERY.



HUNTINGTON'S IMPROVED ROCK-BREAKER.

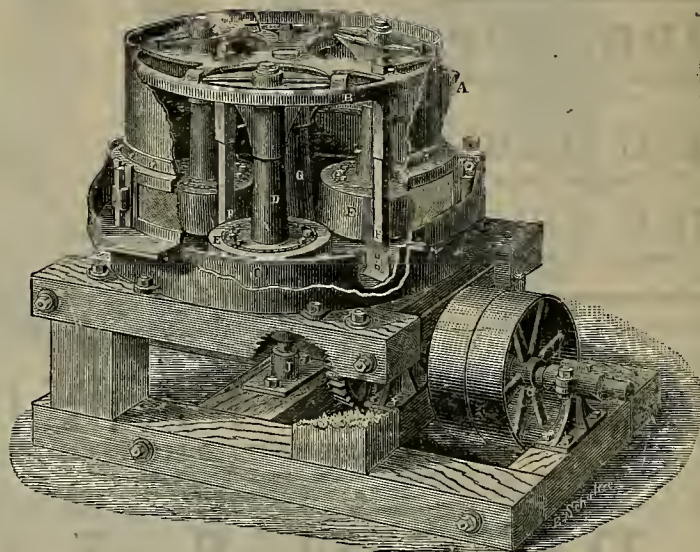
The Main Features of this Machine are Strength, Ease of Adjustment, and Simplicity of Construction.

The moveable jaw A is worked by the eccentric B and is pivoted at the bottom. The stationary jaw D is secured at the top by a bolt running through it, and at the bottom bears against the heavy bolt C. The main wear is, of course, at the bottom of this form, and the wear is easily taken up by inserting a plate between the bolt C and the jaw D. The jaw is thus swung in at the bottom, and the opening where the ore passes through is made correspondingly smaller. As will be seen by the cut, this machine is of very simple construction and is strong and durable.



HUNTINGTON'S PATENT ORE FEEDER.

This Feeder is especially designed to feed the Huntington Roller Quartz Mills; it is simple in construction, and while in motion can be easily adjusted to feed fast or slow; it has but few wearing parts and its positive movement makes it the best Ore Feeder now in use.



F. A. HUNTINGTON'S CENTRIFUGAL ROLLER QUARTZ MILL.

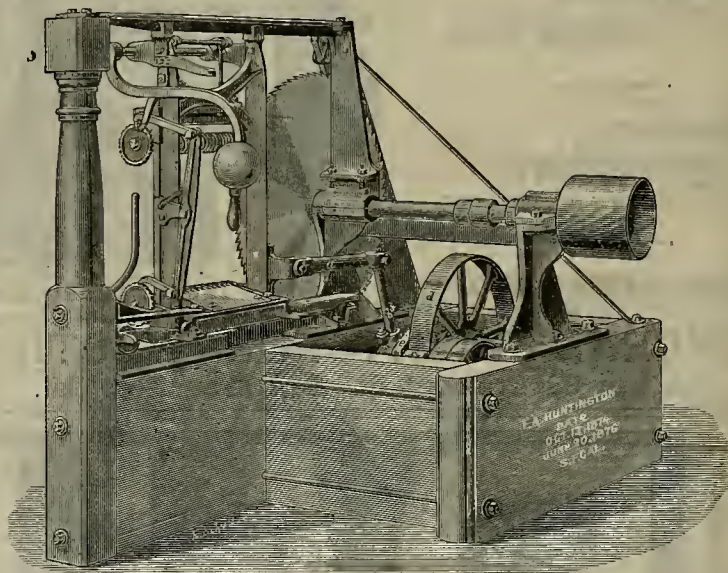
The Following will Explain the Above Cut:

The ore and water being fed into the mill at the hopper A, the rotating rollers and scrapers throw the ore against the ring die, where it is crushed to any desired fineness by the centrifugal force of the rollers as they roll over it.

The water and pulverized ore are thrown against and through the screens when fine enough. The discharge is so perfect that it makes little or no slimes, and leaves the pulp in good condition for concentration. The rollers are suspended, leaving a space of one inch between them and the bottom of the mill, thus allowing them to pass freely over the quicksilver and amalgam without grinding it or throwing it from the mill, while it agitates it sufficiently to make amalgamation perfect. For wet-crushing and gold-seiving it has no equal.

I CLAIM ESPECIAL MERIT IN THAT FEATURE OF THIS SYSTEM WHICH PREVENTS ALL FLOURING OF GOLD AND QUICKSILVER, and the consequent loss of gold that attends stamp-milling.

For the economical working of ore that contains sulphurets, I particularly claim the adoption of this mill. The rotary method of crushing the ore so granulates the pulp (which is discharged the moment it is crushed) that a complete concentration of sulphurets is rendered most easy.



F. A. HUNTINGTON'S PATENT SHINGLE MACHINE.

This machine is so well and favorably known by all the principal lumbermen on the Pacific Coast that it is useless to go into any detailed account of its merits; suffice it to say that recent improvements in a new, quick return feed-works has placed it far ahead of all competitors. Send for Circulars.

F. A. HUNTINGTON,
— MANUFACTURER AND DEALER IN —
STEAM ENGINES AND MINING MACHINERY OF EVERY DESCRIPTION.

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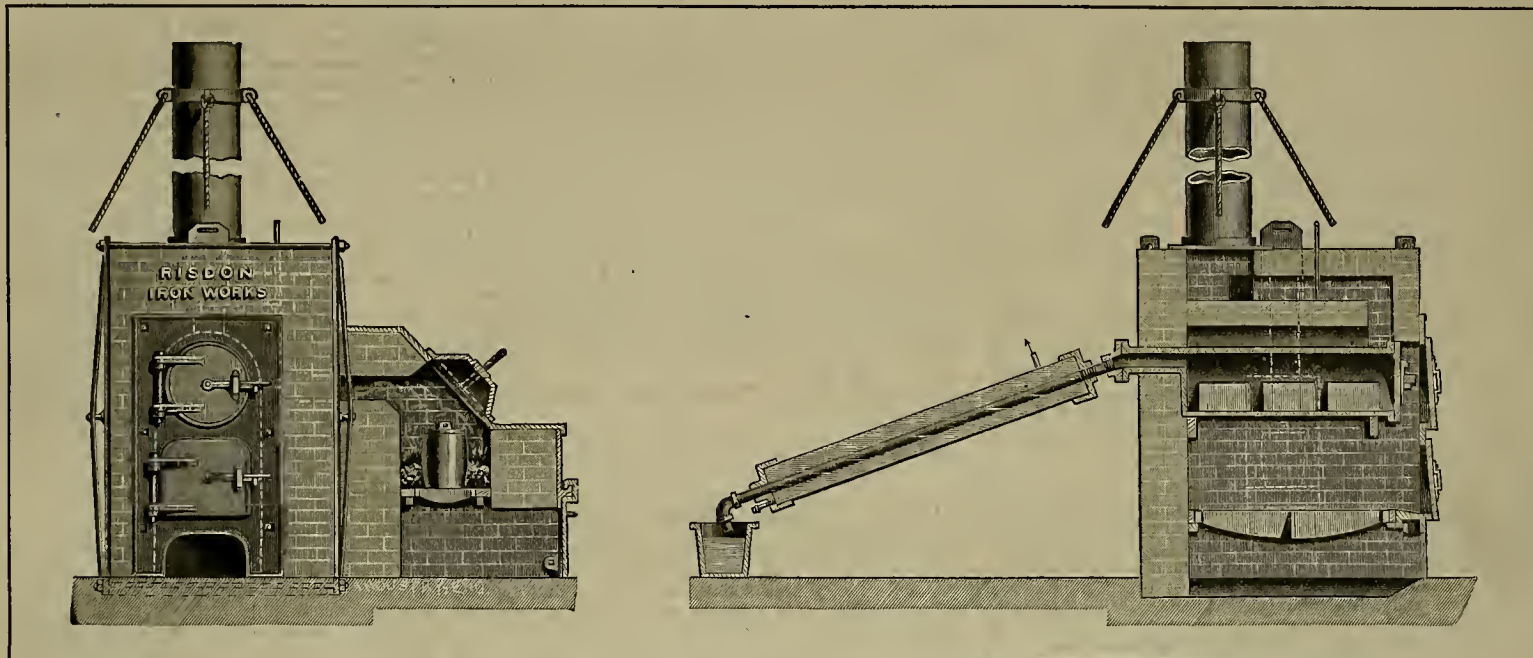
Retorts and Melting Furnaces.

On this page are shown the smaller pattern of cylinder retorts and melting furnaces combined in one setting, such as are

through which a continual supply of cold water flows, condensing the vaporized quicksilver while passing through it to the settling tank. The time required to retort a charge of amalgam depends largely upon

the retort to the fire, insuring a uniform distribution of heat to all parts of the retort. The hand rihs which surround the retort prevent warping. Its supporting brackets are placed centrally, so as to admit

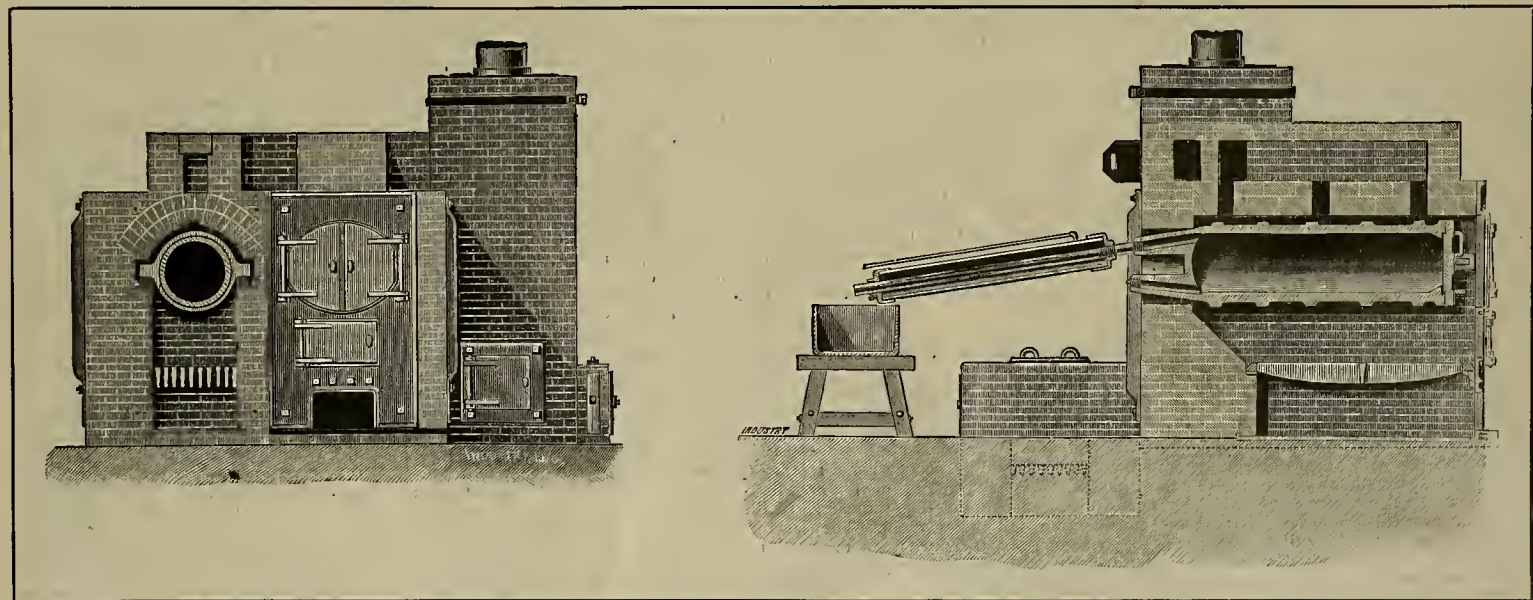
Yosemite and other parts of the State. Mr. Kirchhoff was born in San Francisco, but for many years has been a resident of New York. He was editor of the *Engineering and Mining Journal*, before taking his pres-



FRONT VIEW.

LONGITUDINAL SECTION.

CYLINDER RETORT AND MELTING FURNACE FOR GOLD MILLS.



FRONT VIEW.

LONGITUDINAL SECTION.

IMPROVED CYLINDER RETORT FOR SILVER MILLS.

used in large gold mills and small silver mills.

After being thoroughly strained, the amalgam is placed in the retort, in suitable iron pans; the retort is then sealed, except the vapor discharge pipe, the open end of which is placed under water in the condenser tank. A water-jacket condenser is fixed to and surrounds the vapor pipe,

circumstances, and varies from one to four hours.

The other cuts show a standard 14x60 "silver" retort, embodying Mr. Boss's improvements, by which the usual objectionable bearing bars are entirely dispensed with, the retort having a series of brackets cast on its sides, which rest on the brick walls, exposing the entire lower surface of

of turning the retort over and using both sides, thus increasing its life materially. Retorts and melting furnaces of these patterns are made in this city by the Risdon Iron Works.

MR. CHARLES KIRCHHOFF, editor of the *Iron Age*, of New York, has been paying a visit to San Francisco, after a trip to the

ent position on the *Iron Age*. While here, Mr. Kirchhoff made quite an extended visit to the Pacific Steel Barge Works, Everett, Wash., and several others will be commenced later on.

A 5000-TON WHALEBACK STEAMER will be started at the Pacific Steel Barge Works, Everett, Wash., and several others will be commenced later on.

Sale of the Minarets Mines.

Englishmen Invest in Iron and Silver Properties.

A very important sale of mining property has been effected by Messrs. Allen & Anderson through their London agent. This firm is interested in the well known Minarets iron and silver mines, situated at the Minarets, about 70 miles from Fresno.

Strange to say, says the *Fresno Republican*, though the wealth of mineral deposits in the neighborhood of the Minarets is generally known, the owners have been unable to get American capitalists to interest themselves in the development of the mines. They tried for two years to secure American capital with which to operate the mines, and had finally to go into foreign money markets.

About three months ago Messrs. Allen & Anderson put the property in the hands of a London agent, who with but little trouble succeeded in interesting an English syndicate. Negotiations were at once begun, and after a few cablegrams had passed between London and Fresno, a sale was effected. The sale is subject to the report of the expert whom the syndicate intends to send to Fresno county to examine the mines.

The price agreed upon has not been stated, but it is said to be very large. The expert will arrive in Fresno some time in June and the sale will be concluded immediately after his inspection of the mines. There are six of these; two iron and four silver mines.

The iron mines are really two huge mountains of iron, 1500 or 1600 feet in height. No shafts need be sunk, for the ore can be quarried, like rock. All who have been at the Minarets and know anything about mines, say, that not in any other place on the globe can anything like the iron mountains at the Minarets be found. The ore is free-milling, and there are 14 different classes of it. There is iron there in great quantities from which the finest Bessemer steel may be made. None of the ores are rebellious, and they are entirely free from sulphur. There is magnetic, hematite and what is called Norway iron in inexhaustible quantities. A representative of the State Board of Mineralogy, who visited the Minarets recently, stated there was enough ore in sight to build a double track around the earth, and that the supply was practically inexhaustible.

Captain Allen, of the firm of Allen & Anderson, was asked concerning the reported sale of the mines mentioned. He expressed much regret that they could not have been sold to American capitalists, and said he tried to dispose of them in a foreign market only after he had given up all hope of doing anything here. Captain Allen, of course, is confident that he and his partners have one of the best mining properties in the world, and is certain that the syndicate's expert will be more than satisfied with result of his inspection.

"The iron assays about 67 per cent," said the Captain, "and no better ore can be found anywhere. Here are the assays of four specimens made by Mariner & Hoskins of Chicago: No. 1, iron 66.3, silica 4.57, phosphorus .128. No. 2, iron 66.13, silica 4.27, phosphorus .454. No. 3, iron 67.20, silica 4.40, phosphorus .454. No. 4, iron 62.90, silica 6.35, phosphorus .748. Some of the ore assays as high as 80 per cent.

"As for the silver mines, I doubt that there are richer anywhere. The ore is of the kind called ruby silver and is of the finest imaginable. It is, like the iron, free milling. The few assays made show several thousand dollars to the ton. There is no doubt that the mineral wealth of the Minarets region is surpassed by no other on the globe, and its development will bring a prosperity to Fresno county that will exceed even what it has already experienced in that respect."

The mining industry of the county, which has so long been neglected, will receive an impetus from this sale, the importance of which it is impossible to estimate too highly. While the mineral wealth of the Minarets has been known to many for a long time, there was always a belief that it could not be utilized, or would not be for many years, on account of the locality being so difficult of access. This view is valid no longer, for the San Joaquin railroad is being built in that direction, and if the Minarets are all that is so enthusiastically claimed for them, a feeder would of course be run up to them. The Minarets are already 22 miles nearer than they were last summer, and it is stated that the mountain railroad will be extended 40 miles farther this summer, which would bring it within six miles of the mines.

The outlook, therefore, is most encouraging, and the owners of the mines mentioned have some reason for their self-congratulation. There will be a general revival in mining in Fresno county this year.

Welsh Tin-Plate Makers in America.

There have recently been rumors current to the effect that some of the large makers of tin plates in Wales were contemplating the removal of their tinning plants to this country. According to the *N. Y. Iron Age*, events have come to notice which go far to confirm the rumors and put them into a very reliable report. A most important enterprise of the kind is the project of E. Morewood & Co., the well-known Welsh tin-plate makers, who have already secured some three acres of land at Elizabethport, N. J., where they have excellent facilities for rail and water shipment, and they intend to be tinning plates there by the latter part of the summer. The ground is ready for the buildings, and work is to be begun immediately. The plans for the tinning apparatus are being prepared in Wales, and though it is not yet definitely stated how many pots will be put in operation, the firm intimates that they will coat about 5000 boxes per week. Their American representatives, George B. Morewood & Co. of New York, say that the Welsh firm do not intend to cease making plates abroad, but will continue their works there as the demand warrants. The plant that they are proposing to erect at Elizabethport will be for tinning purposes only, the black plates being made in the foreign mills and brought here for coating, the product being both tin andterne plates. It is the intention of E. Morewood & Co. to begin the erection of very large works as soon as this plant is in successful operation. The larger enterprise will be located somewhere in the West, and will include a rolling mill as well as a tinning plant, the idea being to have an ultimate capacity of from 12,000 to 15,000 boxes per week.

The firm of E. Morewood & Co. are one of the best known in Wales, they controlling two works—one at Llanelli, including 13 mills, with a capacity of some 7000 boxes per week, while the works at Swansea contain 21 mills, with a capacity of some 11,000 boxes per week. The plates made by this concern are Siemens-Martin steel of first and second grade, the best known brands in this market being B V coke and Grange charcoal bright plates and P T L ternes. Of course, the operation of the Welsh mills will depend upon the demand, and at present it seems likely that the reduction in the demand from abroad will be permanent. It must be remembered, however, that there is a large call for plates in this country by canners and others, who reexport and who get practically the whole of the duty returned. Such manufacturers will prefer a foreign plate unless the domestic article is very much below the importing price, because by using the Welsh product, they can save a considerable amount of money. The quantity of plates reexported is, roughly speaking, one-third of the total consumption, so that however successful the efforts may be toward making plates here, there will surely be a large foreign demand for some time to come.

It is also reported that W. H. Edwards of the Ely Tin Plate Works, at Cardiff, is preparing to set up a tinning plant at or near Philadelphia on somewhat the same plan as the Morewoods are about carrying out. Mr. Edwards is also very well known in the tin-plate trade, being a son of Daniel Edwards of the Dyffryn Works. According to report, the black sheets will be made at his Welsh works, and brought here for tinning only; but the home plant will, however, continue in operation, so far as the demand for the product warrants.

The Financial Rewards of Mechanics.

We so often hear it said that "smart" men no longer adopt mechanical professions or pursuits, that we fear many young men may be misled, and many older ones disappointed with their choice of occupation. It is true that many of our "smart" men will not, nor will they adopt any calling imposing any considerable toil upon them. They want to get along by their wits, not their muscle. Surely, well-meaning boys should not be guided by the action of such chaps. There are others who are not lazy nor careless how they make money, but who are over-fastidious, and consider old clothes, grease, dirt and honest, manual toil degrading, even though it requires much brain work also. They may be nice fellows, but they seldom amount to much, and very, very often come at last to that alleged degradation so carefully shunned in their youth. It is not to be expected that such men will ever enter a shop.

Those who talk most about the men of ability steering clear of mechanics think that all the ability comes from the upper-middle, as generally known, and aristocratic classes. The proportion of such people who

now take up mechanical work is greater than it ever was, but the pessimists do not consider that the poor, from which class the shops are recruited largely, furnish more brains and genius than the comparatively well-to-do classes.

Drones and easy-going men will not progress in any walk of life, and there are many mechanics as well as men of other callings who get along poorly. But, on the other hand, there are many professional men, clerks, accountants, etc., who would be far better off if they were skilled workmen in some mechanical capacity. There are instances without number of mechanics rising from a humble position in the shop to great power, influence and wealth, by using their brains and applying themselves to the work in hand. How many have exempted themselves from daily toil by inventions, and by starting in business for themselves in a small way? Thousands in every State.

There are whole wards in Cleveland, owned principally by mechanics, who bought their homes, furnished them comfortably, many elegantly, and sent their children to school, often to college, on their wages. They are in better shape, with better prospects of ease in the future, than the majority of small merchants and salaried store and office help. There are, in fact, few men so independent as a first-class machinist, sober, reliable and industrious, who owns his home, has some money in the bank and a business-like administration of household affairs. How many doctors, lawyers and other men who, when they were turning the corner of boyhood, would call him a "poor fool" for learning a trade instead of going to some "varsity" and getting crammed for a profession, would now be glad to swap positions with this man? You can find them in every block, in every square, in a city or town.

The one who has in him the metal to succeed on the line of his natural adaptability and preference, will find, if his ability lies in the mechanical direction, that there is a broader and infinitely better opportunity for emolument in the machine shop now than at any previous period.—Scientific Machinist.

The Red Cedar Shingle Business.

It is now acknowledged in the East that red cedar shingles from this coast have obtained such a foothold in some markets that no other kind can be sold to any great extent. Carpenters like them because they are light to carry aloft, because they are wide and because they can lay them rapidly. The house owner likes them because they will stand the test of time. Numbers of new shingle mills are being erected on the northwest coast, especially in the State of Washington—so many, in fact, that the question arises, "Will the business be overdone?" The *West Coast Lumberman*, in speaking of the subject, says:

The above question is often asked but seldom answered twice alike, but usually with many ifs and provisos. The question presents problems that are new and perhaps not susceptible of a positive solution, but from the general "layout" we think a reasonably safe answer can be made in the negative. It is true that shingle mills are going in rapidly. At no time in the history of this coast has the increase been as marked as it has since the close of last season's business. Mills are still going in, and it is safe to say that at the close of this year the cutting capacity of our shingle mills will have increased from 75 to 100 per cent over the past year's capacity. Not that the number of mills have increased to that extent, but a large number of the old mills have added new machinery. The statement from actual figures is that one large machinery house in Seattle has sold machinery in the past few months which has a daily cutting capacity of 2,500,000 shingles, or more than 6000 cars a year. This is more than was shipped last year from this section. So much from the affirmative side of the question. Now what have we to offset this? Let us see: In 1889, Manistee, Michigan, manufactured in round numbers 525,000,000 shingles; in 1891 the output had dropped to 200,000,000, or but 25,000,000 over one-third of the former cut. Again, at Muskegon, Mich., was formerly located what was known as the Irish mill, with a daily cutting capacity of 750,000 shingles. That mill was burned last year and will not be rebuilt. We note these two cases on account of their magnitude. Men who are posted say that throughout the districts which were formerly devoted to making white pine shingles the number of mills has greatly decreased. A case at hand is that of the Stinson Mill Co. of Seattle, which has abandoned their large shingle plant in the East, but now manufacture red cedar shingles at Ballard. Again, it is evident that the demand is growing at an unexpected rate, and the fact that our millmen are behind with their orders at this

early date in the season is proof of the growth. Wholesale lumbermen in the East are trying—often without success—to contract for large quantities of our shingles. No better argument could be made for our side than that. It should not be expected from shingle makers that the demand will continue in advance of the capacity and a lull will follow, but nevertheless, by a fair construction of the rule of supply and demand, we believe that the former will not exceed the latter.

Mining in British Columbia.

During 1891 the banks at Victoria, British Columbia—according to the official return just to hand—exported gold to the value of \$358,176. It is estimated that, in addition, about one-fifth of that amount was carried away in private hands, and so we get a total of \$429,811, against \$429,436, the total for 1890. With occasional slight recoveries, the gold output of the colony has fallen off steadily since 1875, when the total was \$2,474,904. Occasionally, in the earlier history of British Columbia mining, the output exceeded \$3,000,000. It would appear from these figures that gold mining in that somewhat neglected and yet promising province of the Dominion has seen its best days; but such is not the case. During the ensuing season we are promised a boom in Kootenay, where a vast mining camp is in process of formation, and experts assure us that British Columbia possesses through its length and breadth vast stores of mineral wealth. The principal metaliferous regions of the province extend laterally from the Rocky mountains to the coast, and include the Selkirk, Purcell, Gold, and Cariboo mountains, the interior plateau, and the coast ranges, corresponding roughly with the regions of the Coeur d'Alene and Bitter Root mountains of Idaho and Montana, the Great Basin of Utah and Nevada, and the western slopes of the Sierra Nevada. Through these regions, belts more or less defined occur, containing valuable deposits of the base and precious metals, of which those in Cariboo (gold, gravel and quartz), in the Selkirk (argentiferous galena, copper, and associated ores), in the Nicola (gold and silver sulphurates), and in the canyon of the Fraser (gold gravels) have been so far prospected. "Everything which has been ascertained of the geological character of the province," said Dr. Dawson, of the Geological Survey Department of the Dominion of Canada, in a recent report, "tends to the belief that so soon as similar means of travel and transport shall be extended to what are still the most inaccessible districts, these also will be discovered to be equally rich in minerals, particularly in the precious metals, gold and silver."

The fact is, mining in British Columbia, having enjoyed a lusty and somewhat extravagant youth and an early manhood of privation; seems to be on the verge of a prosperous middle age. The great success which, in the early days of the gold discoveries, attended the enterprise of placer mining, induced abortive efforts in the more serious and expensive work of quartz mining. The difficulties of transport and the cost of development were not realized; and so the companies formed in these circumstances came to grief. In the meantime there had been a considerable development of the railway system, although, in this respect, much remains to be done. Mining enterprise is guided by wiser heads, with firmer hands, and the friends of British Columbia declare that the era of successful quartz operations has begun. Of West Kootenay, in particular, the report of the Minister of Mines says: "Though no mine in the district is, as yet, fully worked with adequate capital and labor, invested in the hope of realizing dividends, the offers made and the high prices paid for promising prospects, together with the steady work undertaken by claim owners in the Toad Mountain, Ainsworth, Trail, Goat River and Illecillewaet camps indicate that there soon will be in the district mines worked systematically on a large scale, some of which, no doubt, will become dividend-paying properties." The detailed reports from the various centers are full of promise. Placer mining is still carried on in a limited way; but the days of the sensational results that were obtained in the fifties from the rich placers of the Fraser, and in the sixties from Williams creek, are at an end. Steady development, with the aid of the latest inventions of modern science, is the order of the future, and so the judicious investment of capital may bring its liberal reward.

Silver, lead, iron and copper also exist in considerable quantities in British Columbia; but its most important mineral export is, at present, coal. During 1891 more than 1,000,000 tons of coal were produced—the largest figure by far ever reached in the his-

tory of the industry. Here are the comparative figures for four years:

	Output. Tons.	Export. Tons.
1888	459,300	365,714
1889	579,830	441,675
1890	578,141	508,270
1891	1,029,097	806,479

Owing to the absence of an equitable reciprocity treaty between Canada and the United States, within the past few months excessive shipments of coal from distant countries to California have so disturbed the balance of supply and demand that existed during the greater part of last year, that a prudent diminution of output and shipment of coal took place generally from British Columbia, in order to ease off the glut that was brought about by such extraordinary deliveries into California; but it is expected that the market will speedily assume its normal condition. The collieries of Nanaimo, Wellington and Comox were never in better condition than now, and prospects never looked so well for putting out coal. It is well known that vast coal deposits exist which have never yet received attention. In short, the province of British Columbia seems to offer a field of more than common promise for enterprise and investment.—London Financial News.

What Is a "Miner"?

The Anthracite Mine Law of Pennsylvania (1891) states (Art. 8, Sec. 4): "Certificates of qualification as mine foremen and assistant mine foremen shall be granted by the Secretary of Internal Affairs to every applicant who may be reported by the examiners, as heretofore provided, as having passed a satisfactory examination and as having given satisfactory evidence of at least five years practical experience as a miner."

What constitutes a "miner," however, is not defined, and the real meaning of the word is the subject of some dispute.

It seems that some candidates on presenting themselves for examination have been refused the right to sit because they could not give satisfactory evidence of having mined coal for five years. Is this right?

When we speak of any craftsman, we speak of a man who is competent in all branches of his trade, and who is especially competent in the more important and dangerous branches. It is very rarely, however, that we find in any trade a man who is an all-round, first-class workman. In large industries it is well known that the greatest amount of work can be got out of a certain number of men by apportioning a particular piece of work to each, and we must be content therefore to consider any man an artisan who has a good knowledge of the most important branches of his trade.

In reading the law under question, we must consider the object which it is intended to accomplish. It is called "An act to provide for the health and safety of persons employed in and about the anthracite coal mines of Pennsylvania, and for the protection and preservation of property connected therewith."

The intention of the section of the law under consideration is to provide competent foremen, and the workman who knows most about all the work in mines will make the best foreman, as the more he knows, the better able is he to protect life and property.

We do not think five years coal hewing is a sufficient training in this respect, and personally we would rather trust ourselves underground with a man of five years general experience than in the care of a man who has done nothing but hew coal for the same period.

According to law, any man who has labored underground two years can receive a certificate that he is a miner, and if a miner is to mean only a coal hewer, then, after working only five years, perhaps in a single chamber—with never a thought only to secure so many cars of coal a day—and with no experience in timbering, track-laying, bratticing, door-building, or any other branch of the work except cutting coal, he can present himself at an examination and be allowed to sit, while the man who has had experience at all the work but digging, and who for years has had charge of the doors and brattices and timbering, which supply pure air and safe travel to the digger, is refused the right to sit.

The term "miner," as used in this section of the act, must certainly mean a workman in the mines who has had five years of general experience in the work underground, and who understands the practical details of every branch of the underground work well enough to qualify him to be a competent foreman.

THERE are 512,407 telephones in use in this country, requiring 266,456 miles of wire, which on an average allows a trifle over half a mile of wire to each instrument.

Mining Around Black Hawk, Plumas County.

Messrs. Thompson & Kellogg, merchants of Spanish Ranch, and A. Smith, of Butterfly, are coowners in four quartz locations, which, says a correspondent of the Quincy National, are situated on the divide between Blackhawk creek and Upper Butterfly valley, and are proving their faith by their work in the way of developments. They have done a vast amount of prospecting up to date, and have developed a splendid body of pay ore, both in shafting and drifting. They have two shafts sunk on the veins, one 77 feet in depth and the other 50 feet; also a tunnel running on the vein a distance of 127 feet, both shafts and tunnel showing a well defined ledge of gold-bearing quartz encased between a contact of porphyry and slate, varying in width from four to seven feet and assaying in free gold (as near as I can learn) \$16 to the ton, and carrying from five to seven per cent gold-bearing sulphurets assaying into the hundreds. They are at present driving a bedrock tunnel, by contract, to cut the ledge on a lower level, which is 360 feet, and have crosscut three different veins of quartz, 3, 4 and 18 feet wide, all of them carrying free gold and gold-bearing sulphurets. They are still driving the tunnel ahead.

The Golden Gate quartz mine, formerly known as the Jackson ledge, situated on the Snake Lake divide, is also looming up as a gold producer of this district. Messrs. McLaughlin and Stephan having leased this property, have a force of men employed putting in machinery and getting ready to crush ore, which is free milling and is not low grade.

David Bushman and Henry Orr are contemplating sinking a shaft on the old Dr. Coleman ledge, situated at the junction of "Liza's Fork" and Blackhawk creek, and from which, so rumor says, Dr. Coleman pounded out in a hand-mortar over \$1500 from less than ten tons of rock. The correspondent, in 1878, ground sluiced and shoveled into boxes what Dr. Coleman had thrown out as waste, and realized \$11 in free gold for two days' work. This ledge is also encased in porphyry and slate and carries gold-bearing sulphurets.

Messrs. Greves & Bushman have the extension of the above location and intend to do some development work on it this spring. H. P. Wormley is at present doing development work on a fine ledge of quartz, situated on the ridge between Jackson ravine and Newtown flat.

Lee, Richard & Blakesley are engaged in sinking a shaft on the Emigrant Hill divide, and have a splendid body of quartz in sight some 18 feet in width and carrying free gold and gold-bearing sulphurets.

Frank Thomas, having faith in the old Bell location, has done considerable work to uncover the ledge on this side of Emigrant Hill, and has met with success.

All the above locations are good, fair, legitimate ore bodies, and all run parallel with the country rock, N. W. and S. E., and are one continuous vein or ledge, opened and prospected by shafts and tunnels, so as to justify me in saying that the quartz outlook for Blackhawk mining district is just a booming.

The placer mines in this district are holding their own and giving fair returns for the amount of work being done and the mode of doing it.

Thomas & Thompson have a force of men employed on the Emigrant Hill claim, and are pushing the work night and day.

Messrs. Bennett & Bell, having leased the Newtown Flat claim from Mr. Leavitt, are at present washing up the dumps.

David Bushman is making preparations to commence drifting in the Coleman ravine.

Music & Shafer are still at work on Blackhawk creek, trying to realize money enough to buy out the German Empire and make it a free, great and glorious Republic.

Richard Perry is doing some prospecting on Jackass Ravine Hill channel.

Taylor Hill is still busy at work on Little Blackhawk, segregating the potato-raising soil from the gold-bearing gravel by means of a ground sluice, and, rumor says, is meeting with fair success.

Alf. Smith and J. L. Kelley have been running a tunnel on Butterfly creek this last winter to bottom the old river channel in the bill known as the Panama claim. They have run 170 feet of open cut and tunnel and have developed a fine body of gravel. They have one of the finest hydraulic properties in this district if they could be allowed to work it under that system; but as it is, they are trying to find a streak that will pay to drift.

Lucas & Scott are operating on the east branch of Feather river, as is V. B. Kelton and Mr. Race.

A New El Dorado Reported Found.

Col. F. H. Garcia and Mr. B. V. Garcia, accompanied by Captains Aguilera and R. Mallen, says the Tucson (Arizona) Citizen, have returned from Sierra Pinta, the newly discovered gold bonanzas in Sonora, Mexico. The Garcias have obtained a concession or mining zone, quadrilateral, 18 miles long by 12 miles wide, which covers the Sierra Pinta on the San Francisco mountains, the same covering the gold-bearing country near Salinas Bay, on the Gulf of California. Captain Aguilera, as chief of the Geological Commission of Mexico, examined the formation and the auriferous deposits, and Captain Mallen surveyed and established the lines and boundaries of the grant. Within this zone are the celebrated mines of the Pacheco's (the discoverers) and Mr. Cervanti, and two or three other locations that were taken up prior to the zone being granted to Messrs. Garcia, and, of course, those locations will be respected and are the property of the original locators, but everything outside is now the property of the zone grantees. The party remained on the ground about 50 days, during which time they made numerous discoveries of gold-bearing veins, some of them showing greater riches than the Pacheco and Cervanti mine. They found in the San Francisco mountains, joining Sierra Prieta, and within the property of the zone, a richer deposit than any yet discovered in that region. They brought numerous samples, chippings from the outcroppings they discovered, every one showing gold to the naked eye. The mountains appear to be cut up by the innumerable quartz veins, varying from an inch to several feet in thickness, and among them there are many that show gold visible, and will pay to work.

The present trouble is the lack of water, but a well is being sunk now which, if successful, may facilitate the working of mines. However, the mines are but seven miles from the seashore, all along which fresh water in abundance is found within a few feet from the surface, and sometimes springs of fresh water gush up, lapping the salt of the gulf.

The intention of the grantees is to make a short railroad from the mines to the seashore, where to erect the reduction works, and to bring to the mines water, in pipes or otherwise, for use of the mines, and get other supplies, wood, provisions, etc., by the sea. In this way, the expense of building the road will soon be counterbalanced by extending the source of supplies, and save immeasurably in freights of machinery, materials and supplies, the expenses of which, by using the regular overland route, even with the Guaymas road to help, sometimes multiply by three and four times the original value of the goods, when delivered at the mine.

Col. F. H. Garcia and Captains Aguilera and Mallen left immediately for the City of Mexico, to make a report of the work done and perfect the concession, prior to starting the more thorough examination of the property and beginning work.

These great gold deposits have been saved from the grasp of men so long, owing to a belt of 15 miles of arid country that separates them from water on the side of the settled part of Sonora. While at the mines themselves, it is as dry as dry can be, on the seashore the country is deserted since the mines were left alone. But now, such is the wealth of these mines that it pays to pack water for man and beast, for working and extracting the ores.

LONG CABLEWAYS.—Warner & Warner, of Seattle, Wash., write to the *Engineering News* concerning long-span cableways. They say: "We have designed, erected and have in operation at the Culver Mining Co.'s property in the Peshastin Mining District, Wash., an endless ropeway, 6140 feet in length, for transportation of ore from mine to mill. As originally erected and operated it had two spans of extraordinary length, viz.: 2197 ft. and 1750 ft. We later on reduced this 2197 ft. length to 1783 ft. by putting in another station, although there was no physical reason for so doing. Extremely long spans are not economical and should be avoided where possible. The rope is crucible steel, 5-8 in. diameter, and was loaded on the long spans to 1800 lbs. The usual speed is four miles per hour. This is the first bucket tramway erected in the State. It works satisfactorily, and in addition to carrying return loads to the mine, it develops 10 to 12 HP. for use at the mill."

ABOUT the lowest price for pig iron is a rate of \$9 per ton for the product of Alabama furnaces; though during March a quotation of 35s. 3d. was made in London for Cleveland (English) pig. Prices in Belgium, France and Germany have also touched very low figures recently.

Formation of Slate Rocks.

Prof. J. L. Lohley, in a paper read before the British Society of Architects, has the following in reference to argillaceous rocks: No clay rocks produce valuable stone except the slates. Slate rocks are metamorphosed clays, and are of various geological ages. The fine slates of Carnarvonshire are some of Cambrian and some of Silurian age, while those of Valencia, on the southwest coast of Ireland, are Devonian, and those of Cork are carboniferous, and on the continent of Europe there are mesozoic and even tertiary slates.

The term slate, like that of marble, requires definition, for some fissile limestones, locally used for roofing purposes, are incorrectly called slates. A true slate, like a true marble, is a metamorphic rock, and so has a changed structure, from which organisms have been eliminated by the metamorphosing heat, and possesses new characters that make it a quite different rock in all except chemical composition.

The great and essential character that distinguishes a slate is slaty cleavage, which is quite distinct from ordinary rock cleavage in having its direction across instead of parallel or coincident with the plane of original bedding or deposition. Thus most limestones, especially those used for flagging split quite in accordance with their bedding planes, but a Penryn or Festiniog slate splits either at right angles or at a high angle with the original stratification of the unaltered rock.

It is now established, through the observations and experiments of Sorby, D. Sharpe and Prof. Phillips, that this new and remarkable character has been given to the rock by the great lateral pressure to which it has been subjected, and which has changed the direction of the longer diameters of the particles forming the mass from a horizontal to a more or less vertical direction, and has, in addition, to some extent elongated them. This action of the forces of nature has been imitated artificially with successful results, an arrangement of layers of matter having been converted by great pressure at the sides into a mass in which no layers were to be found, but instead vertical cleavage planes. The pressure to which these rocks have been subjected has been accompanied by great heat, which has converted clay rocks into the semi-crystalline stone called slate, and imparted to it a very close and dense texture, which makes it weigh 170 pounds to 180 pounds to the cubic foot, and gives it a resistance to a crushing force of 20,000 pounds to the cubic inch. The transverse strength of slate is greater than that of any other stone.

The mineral of which all argillaceous rock are essentially composed is kaolin, a pure white clay, consisting of silicate of alumina. The chemical elements of all clays, shales, and slates are therefore aluminium, silicon and oxygen, and we must consequently trace the origin of slate through the history of the formation of a bed of clay. Kaolin is produced by the decomposition of the feldspar or feldspathic rocks, such as the granites. This is washed into streams and rivers, and so is conveyed to the sea, where, consisting of matter in an extremely fine state of division, it is carried farther from the shore than is the siliceous sand, and so is deposited separately, which produces an accumulation of argillaceous or muddy material that subsequently becomes a bed of clay.

Like sandstones, beds of clay are not altogether or even mainly directly derived from the parent source, for old clays furnish material for newer clays, and these again are subjected to denudation and provide argillaceous matter for still newer argillaceous accumulations.

Clays of the older rocks that have long been subjected to vertical pressure have been compacted and hardened into shales and mudstones, and when these at great depth have been subjected to high temperatures and to great lateral pressure they have been converted, as we have seen, into the hard and strong roofing slate. The extreme tenacity into which slate will split, and the perfect parallelism of the planes of cleavage, as well as the density and strength of the material, are well exemplified by the specimens exhibited in the Museum of Practical Geology, where there is one specimen five feet long and only one-sixteenth of an inch in thickness produced by simple splitting.

As compared with May of last year, very few men are now out on a strike. Last year the coke ovens were largely idle, and many industries badly crippled or seriously threatened thereby. This showing is a favorable one for the present year, and may be taken as an earnest for the future. The last half of 1892 promises to develop unusual activity in almost all lines.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alameda.

PETROLEUM.—Pleasanton Times, May 24: For the past two years Pleasanton has made a reputation for itself in the discovery of several very important features little dreamed of by the most sanguine of our inhabitants. When the well borers struck artesian water at the depth of only 60 feet, our people were greatly surprised and overjoyed. The flow from this well fills a seven-inch pipe, and has kept it up for months past. When they found terra cotta beds, equal to any in the State, they knew that a large and prosperous business would spring up, if the right kind of people took hold of it. When natural gas was struck in the Odd Fellows' Cemetery, and word reached town, the excitement knew no bounds, and the whole town turned out to see the newly found product of the soil. This find was telegraphed all over the world, and has been the means of bringing many strangers to our town. And now comes our latest discovery, in the shape of oil, by Wm. Napier, on the Hardin ranch. We kept the find secret for some weeks, but as the matter has become known through the filing of legal documents, the cat is out of the bag. Mr. Napier found a substance oozing out of a side hill, on the above-named ranch, which, on investigation, was found to be a very fine lubricating oil, and is thought by many to be in large quantities. This fact, however, can only be found on developing the oil hole. A very satisfactory test has been made by Mr. Price, the San Francisco chemist. An agreement has been entered into and placed on record, wherein the Hardin heirs give Wm. Napier the right to prospect on 484 acres of land, for the period of ten years, with the option of an additional ten years. Work must be commenced within six months, and should gas, oil or minerals be discovered, he must work the well or mine. The Hardina are to receive seven per cent of the net income.

Amador.

AMADOR GOLD MINE.—Amador Ledger, May 21: It is pleasing to be able to chronicle some facts which indicate a speedy settlement of the legal troubles in which this property has been involved for nearly two years. This week the lien men—those whose liens were for labor—were all paid off by John P. Darling, the representative of the American stockholders. The amount paid is something near \$4000. Reports are flying around that the two contending factions, the American and English shareholders, have reached a satisfactory basis of settlement, and that all the claims will ere long be paid. Indeed, the payment of these liens is a pledge that the other debts will be settled. The men who received their money this week agreed to throw off the interest. It is thought likely that matters will be arranged so as to start up the mine again this summer. Cochran, the principal English stockholder, has received a sheriff's deed to the Amador Queen mine, and paid the taxes on that property last week. This is believed to be a really good property, and if incorporated with the Amador gold mine, which doubtless it eventually will be, there are strong reasons for believing that a big and remunerative property would be the outcome.

Butte.

RESUMPTION QUARTZ MINE.—Oroville Register, May 19: Yesterday Wm. W. McMillan of Hurlston showed us some very fine specimens of gold-bearing quartz from the above-named mine. The lode is situated about two miles southwest of Hurlston and is about 300 yards from the Phoenix mine, now being operated by Col. Frary. Some work had been done on the lode in the past, but this rich quartz was discovered by Mr. McMillan about the middle of March. He sank on the ledge 16 feet and found the vein two feet in width. Water came in so freely that it was impossible to sink deeper at that time, but now he will go as deep as he can. The rock is very rich, and from the indications will go from \$50 to \$100 a ton. There are a number of ledges in the vicinity and from some of these in former years large sums were taken. The sulphurets from this lode were assayed and they went as high as \$779 a ton. The ledge has been followed for a distance of about 1000 feet. At the top the lode is only about eight inches wide, but it has widened to two feet in the bottom of the shaft. Should it continue to widen as it descends and prove as rich as it is now, Mr. McMillan has a bonanza that will bring him a fortune. The Phoenix mine near Hurlston, operated by Col. A. P. Frary, is getting better every day. The shaft is now 85 feet deep and the lode at the bottom is four feet in width. Four men are given employment and it is the intention of the superintendent to sink as deep as possible before any mill is built to work the ore.

Calaveras.

INDIAN CREEK MINES.—Citizen, May 21: Indian creek mines are being prospected to some extent. Among them our reporter notices that Cook & Co. are making preparations to sink a shaft, with good ore croppings. Meyers, of the Josephine mine, will resume work on it soon. The Marie and Christmas Gift mines show large bodies of good ore, and parties have been investigating them, with a view of taking hold and developing. On the same veins to the west are the Reddick, Solinsky & Cuneo mines, with fine and well developed cropping. Other mines in this vicinity are being prospected, and we do not doubt but ere long the Esmeralda and Indian creek mines will be known for what they are worth, and a genuine boom will be seen.

AT CENTRAL HILL.—Work on the Last Chance gravel mine at Central Hill is being vigorously pushed by Mr. Albert Mauna, the

superintendent, for the owners—a San Francisco company. Mr. Mauna is an experienced miner, and the company was fortunate to secure a good manager. This claim is between Judge Reed's and Cassinelli's, the shaft being down 175 feet, the last 90 feet being sunk in 45 days by six men in eight-hour shifts. It is expected that another 50 feet will reach bed-rock and disclose a rich body of gravel that is known to run through the claim. The Cassinelli claim is also being prospected for the same channel by a tunnel over 1200 feet in length. At last accounts good pay gravel was coming in.

El Dorado.

TAYLOR.—Georgetown Gazette, May 21: The Taylor mine, in all of its departments, is fitted with an incandescent lighting plant, aggregating 100 electric lights of 16-candle power. Experiments are being made to operate both the pumps and drills, but the practicability of operating these has not yet been satisfactorily determined.

SMALL MILL.—Martin, Ambrose & Co. are equipping their mine on Bear creek with a two-amp mill—water power—and will begin work of developing and thoroughly prospecting the mine. At Kealey, John Knight is driving a tunnel this side of the schoolhouse, to drain the Red Hill mine so it can be worked.

Modoc.

FREE GOLD.—Alturas Herald, May 21: Encouraging news comes from Willow Ranch this week. Robinet & Barnes discovered ore in their mine that carries free gold. It is decomposed ochre and there will be no trouble to work it. They will soon have an arrastre finished and then we can expect shipments of bullion from that mining district.

Nevada.

TWO NEW MINES.—Grass Valley Tidings, May 20: Messrs. Fred. Zeitler, J. S. Ott, E. Woerner and J. A. Reed of San Francisco arrived here Sunday. These gentlemen, with friends, recently incorporated the Western Star M. Co., the mine adjoining the North Star on the west, and are here to inspect the property and determine upon future operations. There is a tunnel in on the claim a distance of 475 feet, and men have been set to work to run it 200 feet farther. Then a plant will be put on and a shaft sunk. The incorporators believe they have a good property—they undoubtedly have—and propose to develop it as fast as possible. Mr. L. P. Goldstone, who represents these and other gentlemen as Superintendent of the Jack Rabbit mine of this district, the Champion of the Nevada district, and the St. Gothard, near the Delhi, has charge of the work on the Western Star.

JACK RABBIT.—The shaft is down 235 feet and sinking is in progress. The ledge, which was broken up by a crossing, is coming in again in good size and the ore of good grade. A GOOD CRUSHING.—Grass Valley Telegraph, May 20: On Thursday a crushing of 18 loads of ore from the Norambunga mine was completed. The ore was crushed at the Joe Southern mill and yielded \$25 per load. The rock came from the upper tunnel in the mine. Faucett & Co. are working the Norambunga and the mine is owned by Wm. Campbell and others. Ore from the mine has paid as high as \$65 per load and the present workings will soon reach a rich pay chute.

GOOD PROSPECTS.—Grass Valley Telegraph, May 23: This afternoon our people were startled at the prolonged noise of a whistle. It kept blowing until the more timid thought that some mining accident had happened. It was nothing of the kind. It was simply the signal that a new mining enterprise had set itself in the now already well-filled firmament of mines. The Oak Tree mine, belonging to Mr. Brock and sons, have their pumping and hoisting machinery now in place and will start work in earnest in the morning, at which a night and day shift of men will be put on. The whistle this afternoon sounded a joyous note. The Oak Tree is situated a short distance from the present Peabody shaft, and it has a shaft down 80 feet. To-day, Mr. Brock showed a piece of quartz taken from the ledge in the bottom, and there was a streak of gold about the size of your finger running entirely through the quartz. A crushing from the mine, and it was completed a few days since, paid \$60 per load. The ledge so far averages about one foot in thickness. The machinery now in use on the Oak Tree mine is that which was at one time used on the California mine. The Champion M. Co. of Nevada City is making many improvements around its premises, especially in the milling department. Mr. Wm. May of Grass Valley has been engaged by the company to remodel the mill, and that he will do the work to perfection goes without saying. Ten stamps are being added, which will make 25 in all, and there will be 11 Frue vanner concentrators at work; new mortars have been put in; a sulphuret house and dry will also be added to the plant, and in a very short time the mill and its equipments at the Champion will be second to none in the country. The last load of machinery was hauled to-day to the Hudson Bay ground, and in the morning the work of putting the machinery in place will be commenced. The machinery consists of hoisting and pumping gear, and Mr. Tregidgo, the superintendent, will push the work forward as fast as possible. It is reasonable to hope that the Daisy Hill mine will soon be in operation. Papers have been drawn up to that effect, but further than that, nothing has been done.

OSBORN HILL MINE.—Grass Valley Union, May 25: The work of reopening the Osborn Hill mine is to be commenced soon, as all arrangements have been made for steam pumping machinery, and a portion of the working force has been engaged. The backwardness of the season, and the absence at Washington of John E. Hobson, who is interested in the enterprise, has delayed operations until this date.

Plumas.

FROM RICH GULCH.—Plumas National-Bulletin, May 19: From A. D. Hallsted, who came up from Rich Gulch, Saturday, we learn that all the drift mines in that section are at work. Mr. Hallsted himself is working on Gray's Flat. Fred Lewis, Capt. Corser and Joe Hallsted are mining on Rich Gulch. Henry Patten is operating the Duncans claim, and has good prospects. Wm. Konradi, Philip and Wm. McElroy are at 12-Mile Bar. C. R. Halls ed, John Murphy and Francis Jackson are working on Taylor Flat. All are busily engaged, and seem to be doing reasonably well.

GENESEE.—Mr. Brandt has been working in his mine and preparing his mill for the season's crushing. Gus Graham, one of the owners of the Green ledge, is very ill. Brown & Sikes have the mine leased, and are working it. The arrastre is running, and the prospects are good. McDonald & Bordin are driving a tunnel on their claim near the Genesee mine. Mr. Gruss is operating the Genesee mine, and he is reported to be doing well. The mine is supposed to be rich. On Grizzly creek, W. S. Dean and two other men are at work washing gravel and with good results. A. Joseph is sinking a shaft on his claim. Chas. Morain is taking out good pay on Grizzly Mountain.

San Diego.

PROGRESO.—Julian Sentinel, May 19: To our mining industry five new quartz mills have been added and many old and new properties opened up, some of which have been put upon a paying basis. The Bailey brothers, for 22 years identified with the mining development of the camp, have recently remodeled their machinery and completed the finest water-power in Southern California. They are now preparing to add an electric plant, and when the works are complete, will be by far the greatest improvement the camp has ever witnessed and will mark a new era in the history of this region.

Shasta.

AN OLD MINE.—Dunsmuir News, May 20: M. D. Butler of the Tamarack quicksilver mines went down to Delta a few weeks ago and purchased an abandoned mine about four miles west of that place. The mine had a shaft 100 feet deep, and Mr. Butler cleaned out the old shaft and commenced sinking it deeper, where he struck a bonanza. The rock is literally sprinkled with free gold. He does not know yet just how large the ledge is, but he is confident of it containing gold enough to make him rich the remainder of his life.

TWO RICH CLAIMS.—Redding Free Press, May 21: Vandever and Bullard are making some money on Flat creek—in fact, they have a good mine and are in a fair way to lay up a neat estate. Their tunnel is 250 feet long, and their ledge is four feet wide, rich enough to work clear across. They made a partial clean-up recently of their arrastre from a ten-days' run, and brought to town 11 ounces of good gold, averaging \$19 to the ounce. While their rock is free-milling, yet they must lose more or less fine gold by the arrastre process. They have crushed 30 tons of rock altogether, and have no fault to find with the result. Below this claim on Flat creek a miner named Joe Holman recently panned out \$28 in one day, and one piece of gold and quartz recently brought to town weighed \$9. It is a rich ledge, from which \$28 can be panned in one day! This rich claim is not far distant from the place where a man named Young found a \$600 lump a few years ago.

NOTES.—Ore is now being hauled from the mines on Flat creek to the Shasta mill. The Calumet Co. will soon have 14 large tanks operating on the MacArthur-Forrest process machinery for the new mill of the Gold Run Co., which is putting in the MacArthur-Forrest process, passed up the road this week. M. D. Butler of the Altoona cinnabar mine was in Redding this week exhibiting to his friends some very rich rock taken from the old Whitlow mine near Delta. Mr. Butler purchased the mine of Whitlow, which has been developed by a tunnel 250 feet long. About 200 feet in, Mr. Butler found traces of a good ledge and immediately set a force of men to work. The first blast let off uncovered a splendid ledge of fine ore. The people of Delta are rejoicing over this new find.

NEVADA.

Washoe District.

A NEW DEPARTURE.—Virginia Enterprise, May 22: Yesterday morning Supt. Ryan of the Hale & Norcross inaugurated an entirely new departure in the working of the mine that is of very unusual interest, and which may be followed by results of not only great benefit to stockholders, but Comstock mining interests in general. The departure consisted in the beginning of repairs to the incline below the 1640, or Sutro tunnel level, with a view to opening it up to the 1800 level and the establishment of mining in that part of the mine. In the original sinking of the incline years ago, the haste to reach the lower levels prevented the prospecting of the mine at all between the 1700 and 1900 levels. The ground between these levels is therefore to-day an unknown land—an unexplored country, a storehouse of possibilities, a repository, as it were, of potential bonanzas. Supt. Ryan proposes to explore it and bring to light whatever it contains. This is an encouraging undertaking. The block of ground to be prospected is very large, and within its area there is plenty of room for an immense amount of ore. This is the first resumption of mining below the 1640 level, or the Sutro tunnel, since the Combination closed down and deep mining ceased in 1886. Between the 1600 and 1700 levels the mine has only been partially prospected, and there is room for large developments in that neighborhood. It is also known that there was no ore in the 1900 when work was stopped there. If this departure should prove

successful, and profitable ore developments be made, the sentiment favoring the resumption of mining in the lower levels all along the lode will receive an impetus which may be followed by great and lasting results.

CONS. CALIFORNIA AND VIRGINIA.—Chronicle, May 21: There has been extracted from all parts of the mine during the week 1064 1600-2000 tons of ore which was shipped to the Morgan mill, the average value of which, per car samples, was \$29.57 per ton. The average assay value of all the ore worked at that mill during the week, 980 tons, was \$26 per ton, per battery samples. Bullion shipped to the Carson mint, assay value, \$14,830.90. Bullion now on hand in our assay office, assay value about \$14,500.

OPENING.—1465 level.—In working easterly from the mouth of the north drift, from the drift run west from the winze 122 feet below the sill floor of the 1300 level, we have extracted and raised to the surface during the week 20 tons of ore, the average assay value of which is \$21.70 per ton.

MEXICAN.—On the 1405 level from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level near the south boundary of the mine, at a point 40 feet east from the winze, a north drift was started and has been advanced 11 feet in porphyry.

UTAH.—340 level.—From the west crosscut, at a point 595 feet from the shaft, the north drift has been extended 54 feet; total length, 170 feet; continuing in vein porphyry showing some quartz and clay.

ANNE.—During the week west crosscut No. 3 from north drift on east side of the ledge advanced 21 feet and work suspended in the face for the present; formation quartz and soft porphyry.

BEST AND BELCHER.—900 level.—East crosscut No. 1 has been advanced 19 feet through hard porphyry; total length, 159 feet. West crosscut No. 1 has been advanced 19 feet through hard, barren quartz; total length, 241 feet.

GOULD & CURRY.—On Sutro tunnel level the joint north drift with Savage Co. has been advanced 19 feet; total length, 473 feet; face in porphyry.

HALE & NORCROSS.—On the 900 level are stopping out ore from above this level, and stopes continue to look about the same as last report. Retimbering main drift from the shaft. Hoisted from this level during the week 270 cars of ore. 1000 level.—Have opened a working station at this depth from the bottom of 900 north winze and started a south drift from same; face of the drift shows considerable quartz, but of no value. 1100 level.—Stopping out ore from north and south stopes above this level. No particular change in the stopes. Extracted from them during the week 255 cars of ore. 1300 level.—Have opened a new winze station 125 feet north of shaft, and will commence sinking below this level during the coming week. Also opening a new working station at head of the main incline. To-day began the work of opening the main incline below Sutro tunnel level, with the intention of later opening an 1800-foot level from the incline. Hoisted during the week 525 cars of ore. Shipped to Brunswick mill 429 1510-2000 tons. Average assay of railroad car samples of ore shipped to Brunswick mill for the week \$21.52. Average battery assay for the week \$14.81. Shipped from Brunswick mill to U. S. Mint, Carson, bullion of the assay value of \$7,547.36.

CHOLLAR.—We are making the usual amount of repairs on the 450 and 750 levels. The north drift from the bottom of the shaft, 930 level, has been repaired for 300 feet north of the shaft.

POROER.—Extracted and sent to mill in the past week 381 1300-2000 tons of ore from the 930, 1100, 1150 and 1250 levels. On hand at mill, 80 600-2000 tons; average battery assay, \$22.18. The joint northwest drift from 1800 level of the Ward shaft is out from the station 400 feet; face in porphyry.

BULLION.—The joint Potosi winze is down 300 feet below the 1500 level; bottom in quartz that gives low assays. East crosscut, 320 feet south of north line, 1300 level, is out 142 feet; face in porphyry. The drift started south at a point 28 feet east of the west boundary of the quartz in the east crosscut, 320 feet south of the north line, 1300 level, is in 36 feet in quartz yielding low assays.

ALPHA.—The joint Exchequer and Alpha south drift from north line of Exchequer 1800 level of Ward shaft, has been extended during the week 30 feet; face in clay and quartz.

OCCIDENTAL.—The west crosscut from the south drift, 400 level, is in a total distance of 110 feet, and continues in a favorable formation, carrying seams of pay ore. The north and south drifts from this crosscut have been extended during the week and show a little pay ore.

CON. NEW YORK.—The north drift from No. 4 crosscut, 650 level, is out 23 feet; face in ore of fair grade.

Osceola District.

GRAVEL.—Cor. Salt Lake Journal, May 21: At Osceola they are working 50 men on the different claims of the Gravel Mining Company, and everything denotes a long and prosperous run. At Sacramento, Woodman & Co. are at work taking out ore. The dry washers have been idle owing to the damp weather, but they are getting out and opening up dirt, ready for a prolific summer's work.

Minervia District.

DISCOVERIES.—Cor. Salt Lake Journal, May 21: Some rich discoveries have been made in Minervia district. In fact, the whole county is full of renewed life and energy, and the prospectors are meeting with good success both in new finds and development.

Eureka District.

EUREKA CON.—Sentinel, May 21: President Fries of the Eureka Con. Mining Co., accompanied by his wife, arrived here last Saturday. The result of this visit is a change in the management. Al. Burt, who has had charge of the

Eureka Con. mine for the past four years, is retired, and H. C. McTerney, who has acted as secretary of the company, has been appointed superintendent. The cause of this change is stated to have been complaints of triniters to the president that Mr. Burt did not give them a fair show. No one attempts to depreciate Mr. Burt's worth as a thorough and competent miner, but he has unmistakably made a number of enemies through the stringent measures that were adopted for the management at the mine. He left last Wednesday for Ogden, where he has business interests, and from there he will take a trip to England. Geo. W. McKim has been appointed night watchman at the mine in place of Wm. Harris, and other changes are talked of.

Ely District.

Not Sold Yet.—White Pine News, May 21: Reliable reports from Ely, White Pine county, are that the Joanna and Chaimmen group of mines have been sold to the Colorado parties that have been negotiating for this property for a year. If the sale has been made, Ely will be the best gold camp west of Black Hills.—*Ely Independent*. Onr neighbor is right in the last sentence. The first, however, is a little mixed. The present Colorado parties have not been negotiating for these properties more than six weeks. No sale has been consummated, though the arrangements looking to that end are as perfect as can be without a transfer of property.

White Pine District.

PEACOCK BULLION.—White Pine News, May 21: Newt Boyd dropped into our office a few days ago and laid upon our case a nice little bar of gold bullion weighing 37½ ounces, the product of 27 tons of Peacock ore worked at the Ely mill. The ore averaged about \$20 per ton and milled perfectly free. The boys have about 200 tons of ore on the dump that will mill \$10 to the ton. But the expense of handling it across the valley and mill charges will not permit of this ore being worked. The Peacock is one among the most promising mines in this section for the work done on it, and with more development and a mill of its own would in a short time become a good bullion producer.

MONTANA.

ABOUT PLACER MINING.—*Inter-Mountain*, May 17: Placer miners are very jubilant this year, and anticipate one of the best seasons in many years for their business. The mountains and gulches are filled with snow and an abundance of water to wash the gravel is assured. In the vicinity of Butte the Chinamen are the most industrious followers of placer mining. They go to work in diggings which pay only \$2 per day and are satisfied. The ingenuity of the Chinamen very frequently comes to notice, and it has been illustrated in the business of placer mining. It is well known that under the United States laws Chinese cannot take up public land for any purpose. They manage, however, to get the land to work, if they don't get title to it. They get white men to take up their placer claims and pay them \$10 per month for every Chinaman employed on the ground in placer mining. This system of doing business has been going on for some time in the Highland placers, and prospectors have made a comfortable living, at the same time working their quartz claims and receiving a monthly income in advance from the Chinese. Last week a gang of ten Chinamen left for the Highland mountains, south of this city, to go to work. They will enter upon an old claim, which, it is said, will not pay over \$2 to the man per day. But that satisfies the Chinamen who are employed by companies. Frank G. Lamson has received word from C. C. Frost that he has organized a company to work placer ground in the Highland district. It is said the ground which this concern will work embraces ten miles in Fish Creek gulch. Mr. Frost starts for Butte to-day from Norwich, Conn., and he expects to be in active preparation for the season's work by June 1st.

OREGON.

GOON PROSPECTS.—*Eugene Register*, May 20: Mr. E. C. Smith has returned from his trip to his mines near Riddle, Douglas county, and brought home some fine specimens of gold picked up there. In one bottle he had about \$5 worth of gold which a boy had washed out with a hand-sluice in a day. The ground all around is very rich. Those residing there have been washing out considerable this winter. Mr. Smith is now working up a stock company to develop the mines. They are figuring on a new plan of obtaining water for hydraulic mining. That is, instead of tapping streams to obtain water, to establish a pumping station on the banks of the Umpqua river, which is close at hand, and pump water from the river and force it into a reservoir at the head of the flume. At this place this can be done very readily, as the water will have to be raised only about 400 feet and be forced through a pipe a distance of a little over one mile. They are figuring on this plan now, and think that it will be much cheaper than digging a large number of ditches to tap the small mountain streams.

UTAH.

CAMP CROSSCUTS.—*Park Record*, May 21: Repairs at the Marsac mill have been completed and the stamps are again dropping on ore. The mill is now in thorough condition for another year's steady grinding on Daly ore. Just now the mines are suffering from the annual spring flood of surface water, and the extraction of ore and prosecuting developments are consequently greatly handicapped. As soon as the snow melts the trouble will be obviated. The Glencoe is reported to be looking better to-day

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.		No. AMT. LEVIED, DELINQ. AND SALE.		SECRETARY.	
Alpha Cons M Co, Nevada	10	100	April 14, May 18, June 8	O E Elliott, 309 Montgomery	June 7
Becher S M Co, Nevada	4	250	May 17, June 18, July 1	O L Perkins, 431 Pine	June 7
Brumwick Cons M Co, California	3	250	April 18, May 18, June 3	J Stoddard, Jr, 309 Montgomery	June 6
Bullion M Co, Nevada	33	250	May 24, June 26, July 19	R R Grayson, 331 Pine	June 6
Challenge Cons M Co, Nevada	11	250	May 16, June 10, July 12	O L McCoy, 331 Pine	June 6
Diana M Co, Nevada	8	250	May 3, June 10, July 30	R Grayson, 331 Pine	June 6
Edipase M Co, California	1	250	April 23, May 25, June 18	O Tum-Suden, 402 Montgomery	June 7
Golden Prize Cons M Co, Nevada	5	250	Feb 29, June 3, June 29	O D Bennett	June 7
Gray Eagle M Co, California	28	250	April 14, May 25, June 14	A W Barrows, 303 California	June 6
Justice M Co, Nevada	50	150	May 2, June 6, June 27	R E Kelly, 419 California	June 6
Occidental Cons M Co, Nevada	10	250	May 16, June 10, July 12	O E Elliott, 309 Montgomery	June 7
Occidental Cons M Co, Nevada	10	250	April 8, May 9, May 31	A K Durbow, 309 Montgomery	June 1
Overman M Co, Nevada	30	250	May 15, June 22, July 11	G D Edwards, 414 California	June 6
Seg Belcher & Miles M Co, Nevada	10	250	April 8, May 12, May 31	E B Holmes, 309 Montgomery	June 6
Siskiyoun Cons Quicksilver Co, California	4	100	May 14, June 17, July 8	E E Stone, 308 Pine	June 6
Summit M Co, California	12	50	June 27, July 19	M E Welles, 309 Montgomery	June 6
Yellow Jacket M Co, Nevada	51	250	May 8, June 14, July 18	W H Blauvelt, Gold Hill	June 6

COMPANY AND LOCATION.		MEETING. SECRETARY AND OFFICE IN S. F.		DATE.	
Caledonia M Co	Annual	A Cheminant, 309 Montgomery	June 7	June 7	June 7
Clara Cons M Co	Annual	A Cheminant, 309 Montgomery	June 6	June 6	June 6
Crown Point M Co, Nevada	Annual	J Newlands, 331 Pine	June 6	June 6	June 6
Gray Eagle M Co	Special	A W Barrows, 303 California	June 6	June 6	June 6
Peer M Co, Arizona	Annual	Aug Waterman, 309 Montgomery	June 2	June 2	June 2
Peoples M Co, Arizona	Annual	A Cheminant, 309 Montgomery	June 7	June 7	June 7
Silver Hill M Co, Nevada	Annual	D Bates, 309 Montgomery	June 1	June 1	June 1
Weldon M Co, Arizona	Annual	Aug Waterman, 309 Montgomery	June 2	June 2	June 2

COMPANY AND LOCATION.		LATEST DIVIDENDS.		SECRETARY AND OFFICE IN S. F.		PAYABLE.	
Bulwer Cons M Co, California	10	100	L Osburne, 309 Montgomery	May 10	May 10	May 10	May 10
Champion M Co, California	10	100	T Wetzel, 310 Pine	May 10	May 10	May 10	May 10
Cons Cal & Virginia M Co, Nevada	50	50	A W Havens, 309 Montgomery	Aug 17	Aug 17	Aug 17	Aug 17
Eureka Cons M Co, Nevada	25	25	H P Bush, 101 Sansome	Jan 6	Jan 6	Jan 6	Jan 6
Great Western Quicksilver M Co	25	25	A Haley, 308 Montgomery	Oct 6	Oct 6	Oct 6	Oct 6
Peacock Cons Borax Co, California	1	100	H H Clough, 230 Montgomery	May 10	May 10	May 10	May 10
Standard Cons M Co, California	10	100	J W Pew, 310 Pine	Apr 26	Apr 26	Apr 26	Apr 26

Rudolph L. Johansen, machine for utilizing ocean power, etc.; William Loay Jr., coated metal pipe and manufacturing the same. Stockton—Israel D. Vandecar, voting booth. Pescadero—F. L. Armas Crupper, strap fastener. Centinela—Max A. T. Boehncke, brick kiln. Edwanda—John E. Lonthian, hose-coupling. San Jose—Geo. A. H. Fleming, fruit-grader. Tropic—Charles H. Huff, mangle fastener. Washington—Frank and G. W. Ansley, of Medical Laks, combined milk-pail and strainer. Oregon—Samuel O. Saunders of New Bridge, car coupling.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

CRUSHING MILL.—Chas. E. Philes, Stockton, Cal., assignor of one-half to Thomas J. Smith. No. 475,284. Dated May 17, 1892. This is one of that class of crushing mills in which centrifugal spring rollers are employed, said rollers operating in a pair and being pivotally hung from a revolving driver above. The invention consists in a novel spring acting on the rollers to hold them positively to their work against the ring-die of the pan. The object of the invention is to provide a simple and effective spring for this purpose which can be readily applied and easily removed to enable any roller to be taken out, said spring being durable and not liable to injury or deterioration due to the severe jar in the operation of the machine. The spring may be adjusted as the rollers and die are.

DIET GRADER.—Wm. P. Ball, Fresno, Cal. Assignor to Truman, Hooker & Co., San Francisco. No. 474,896. Dated May 17, 1892. This invention relates to that class of dirt separators prepared with a bowl adapted to be turned by a rearwardly projecting handle, said bowl being connected by draft rods or links with a draft power in front. The chief object of the invention is to provide means for enabling the operator to turn the bowl to any point which he may desire, whereby its contents may be discharged in greater or less volume over the ground and be equally spread thereon. The particular object is to provide for limiting connections with respect to the bowl and to its connected parts in such a way as to provide for simplicity, economy, and general effectiveness, and ease of adjustment.

REVERSING GEAR.—John F. M. Woods, Oakland, Cal. No. 475,026. Dated May 17, 1892. This is a reversing gear for steam engines. The invention consists essentially in a cylindrical valve seat adapted to be oscillated, and provided with suitable ports so arranged that by its oscillations they shall be brought into changed relations with the ports of the valve and cylinder to effect the reversal of the engine. The object is to simplify the reversing mechanism of an engine by dispensing with all link motion and also dispensing with one of the eccentrics usually employed to effect the reversal by reversing the valve itself.

DIFFERENTIAL GRAB.—Geo. Cottrell, S. F., assignor to the Joseph Wagner Manufacturing Co. No. 474,903. Dated May 17, 1892. This invention relates to a novel device for applying power by means of a differential gear. It consists of an internal drum or gear, a spur gear of smaller diameter, the teeth of which mesh into the teeth of the internal gear, an eccentric by which the spur gear is given a throw, so that its teeth successively engage those of the internal gear, and a movable guiding disc or cross, operating in connection therewith.

FRUIT PITTING.—A. G. Carter, Fresno, Cal. No. 474,901. Dated May 17, 1892. The object of this machine is to provide a simple and effective way and means for extracting fruit pits, and especially and particularly for removing the pits of clingstone peaches. This mode or method has for its basis the holding of the pit and its severance from the flesh by a twisting action, gained by a rotary or partially rotary movement imparted to the flesh while the pit

is held stationary, or to both flesh and pit in opposite directions. This method, while applicable to various fruits, is especially serviceable in stoning clingstone peaches, as it will take the flesh off quite easily and leave but little on the pit.

WATER FRONT OF FIRE BOX FOR BOILER.—J. T. Charest, Red Bluff, Cal. No. 475,035.

Dated May 17, 1892. This invention has for its object the construction of a boiler furnace with surrounding walls and a hollow front wall, a hollow bridge wall, and connecting and circulating pipes by which communication between these hollow walls and the interior of the boiler is maintained, and controlling cocks to cut off any of these connections so that the hollow front wall, the bridge wall, connecting pipes or the boiler itself may be blown off and cleaned independently of each other.

Mining Share Market.

SAN FRANCISCO, May 26, 1892.

The market continues lifeless, with no encouraging features to note, notwithstanding that extensive prospecting and developing work is being done in each group of mines on the Comstock. If the conditions were different, this work would have a telling effect on the share market, and shares would be selling several times higher than the "laundry men" have them quoted on two exchanges. Briefly stated the unfavorable conditions are as follows: The rotten market, not to say the way in which Comstock mines are looked at, if we accept the developments in the Hale & Norcross suit as a fair sample; continued assessments, with the work being done, not calculated to show up much, if any, ore, for it is evidently pushed only far enough to get near ore without striking it; no speculative spirit manifested either here or at the East; and the low price of silver which takes away a very large percentage from the silver bullion sold. This last is a heavy drain and which, no doubt, has considerable to do with the unsatisfactory condition of the share market.

While the large majority of operators in mining shares are bears, made so by the unfavorable surroundings of the market, yet there are a few pronounced bulls. The latter say that the most important work that is being done, is toward the West or Red lode, and this being gold-bearing, the price of silver should have very little effect. The bears claim that the gold ore is taken from mines lying to the west which may lead to litigation. The bulls claim that through the efforts of the Mining Stock Association, assisted lately by the Brokers' Combine, the mill rings on the Comstock are being forced to conform to the law, and that mine-lotting will be a thing of the past. In substantiation of this, they cite the weekly letters of the superintendents of Hale & Norcross, Overman, Savage and Con. Virginia. The bears claim that these reports being a forced proceeding, the mill ring will certainly continue mine-lotting, but in a way that will come the worst of all, and until it is over, there will be no chance for creating a speculative movement in mining shares. The above outline of divergent opinions is given to let each reader form his own opinion which side is the nearest correct.

The movement inaugurated in the Comstock district calculated to down the mill rings, and have the mines more honestly worked, is due to the strong and determined fight waged by the Mining Stock Association against the mill rings. In their fight they have lately been assisted by a combination of several leading brokers to force the rings into the market to buy shares with which to control the mines. Of course, after each contest the shares of the mines contested for, go up a piece, while the story is under way more market activity and outsiders are able to sell out and afterward buy back at a good round profit.

A special meeting of stockholders is called by the Weldon and the Peer Mining companies to make some kind of disposition of the shares now in the office of the respective companies. The majority of the Comstock shares, is due to a contest by the Brokers' Combine for control of the mine. Outside shareholders should stand in with the combine. A reformation is wanted in the Gold Hill group of mines and this contest offers the desired opportunity to secure it.

The secretary of the Mining Stock Association should invite another force of outsiders to the offices of the Savage, Potosi and Con. Virginia mines, requesting that they conform to the law more fully; half way conforming should not be tolerated. The Overman management might also be notified with good effect. The Hale & Norcross weekly letters, so far as we know, fully conform to the law.

It is claimed that the Manuel Eyle suit against the directors of several mines on the Comstock will be compromised soon after the Supreme Court reversed the decision of the Superior Court, and that Judge Hunt's decision in the new trial was expected. In other words, there was no genuine fight.

Car sample assays are reported by the Hale & Norcross, Overman, Con. Virginia and Savage companies. The assays reported by these companies are such that the Bulwer Mining Co. will in July next, commence the regular monthly payments of dividends. It is also asserted that Bodie is to be assessed, after which there will be a good move in the shares. It is said that the Con. Pacific mine is being lotted.

Information is made public that in Hale & Norcross important work will soon be commenced to open up two lower levels. The company has money in hand and it looks as if the officials are determined to squander it on work that is not at all necessary at present. There is very rich ore on the upper levels; why not take it out? There is talk of deeper work in Con. Virginia; this mine, like several others on the Comstock, has rich ore on the upper levels. In Stockton, the Union, Mexican and Onitash are important work has been and is being done, but it is questionable if it will benefit any one except the inside rings. It is said that in Best & Belcher some ore that was not taken out and milled by another company, is liable to be struck for stock juggling purposes. In Savage they are fooling around a body of good milling ore. Potosi continues to be worked as does Con. Imperial and Challenge, but no one, outside of salaried officials and mill owners, is benefited. Now that Bullion has levied an assessment they ought soon to report a rich ore strike. Assessments must be collected. In Alpha and Exchequer they are not, so far as outside letters go, doing any important work, but it would probably take the upper levels found to the west about three years ago. Mystery still shrouds the work in two or more of the mines. Very secretive miners are now employed.

From the outside mines our advice are uniformly favorable from the Bodie district, Tuscarora district and the Bodie district, but it would probably take a mountain of gold to get outside operators to buy the shares of the mines in the above district. Years ago talk and a few paid puff in newspaper sold stocks, now something more substantial is necessary,

MECHANICAL PROGRESS.

Dry-Crushing Machinery.

At a meeting of the Society of Engineers held at the Town Hall, Westminster, Mr. Joseph William Wilson, junior president, in the chair, a paper was read by Mr. Samuel Herbert Cox, on "Dry-crushing Machinery," and an abstract is published in *Iron*. The author having stated that the improvements of recent years in chemical and metallurgical processes had rendered necessary the introduction of dry-crushing machines, affirmed as a first principle of success, from an economical point of view, that it was necessary to use the different machines for the work only for which they were designed. While admitting that it was, perhaps, difficult to draw hard and fast lines for the work of machines, he thought no trouble would be experienced in defining the main duty of different classes of plant, or their combination in the most efficient groups. Pursuing this principle, he stated that it was uniformly advantageous to employ two stonebreakers, set to different gauges, to reduce the stone to such dimensions as would enable the fine crushing mills to work most effectively, and that the stone should be screened after each operation in order to avoid passing material through the machinery which was already fine enough. He then alluded to various forms of fine-crushers, *e. g.*, the Marsden fine ore-crusher; stamper batteries; Krom's rolls, and Coward's Niagara mill, which he described, touching lightly also on the various ball machines such as the Globe mill.

While admitting that each of these possessed certain advantages he gave his unhesitating support to the Krom rolls as the most efficient for dealing with hard rock and reducing it to a fine powder. He gave, in illustration, a description of a plant of this class which he had recently erected, stating, that with a 12-nominal horse power semiportable engine and boiler, the whole plant, consisting of two stonebreakers, one pair of Krom rolls, three elevators, and one dust exhaust-fan, was driven in a thoroughly satisfactory manner. The total cost of this plant, including buildings and erection, was £3,000, and the capacity, through a 40-mesh sieve, 30 cwt. per hour. The small number of wearing parts in a plant of this description is very important, as also is the fact that the rolls can be run until the tires wear to about 1/2-inch thick, when they are easily replaced. The uniform nature of the products in which these machines differ greatly from most other crushing and grinding machines is moreover of the greatest value.

The combination of crushing and grinding in the same machine may generally be looked upon as wrong in principle, tending to make a larger proportion of dust, which in subsequent wet treatment would result in slimes. Referring to the numerous disintegrators which are also used for dry-crushing, the author pointed out that, although they were sometimes employed on stone, the high speed at which they were driven, and the necessarily somewhat heavy wear, involved constant repairs when they were used for this purpose, but, in their own province, *viz.*, for crushing softer and somewhat elastic materials, for which any direct crushing plant would be useless, they are unequalled; and where the material to be treated contains some moisture and is liable to clog ordinary screens, they are infinitely superior to all other types of machinery.

THE subject of street car fenders has again been investigated by a commission appointed by the West End Ry. Co. of Boston. One hundred and twenty-nine different fenders were submitted to the committee for examination, and they were classed as follows: Buffers, which soften the blow given to the person by the car, and pick him up in a net; platforms projecting beyond the dashboards, upon which a person could leap, or upon which a body could be caught and carried along; fenders below the car platform, whose object it is to push along a body lying on the tracks, and prevent it getting under the wheels. Three methods of operation were also disclosed: Where they are always in place ready to catch a body; where they require the action of springs or other device operated by the force of the blow struck by the car upon the body; where they require the direct action of the motorman to put them in operation. After careful examination of all these, the commission believe that public safety can be increased by the adoption of possibly two devices, as follows: A movable platform projecting in front of the car platform with an elastic buffer or stout wire or metal strips, and curved so as to project from the front dashboard and receive the blow of a person's head and shoulders on a yielding surface.

This buffer could be easily detached and changed from one end of the car to the other. The meshes of the buffer should be large enough to enable a person to seize it with his hands. The second device is to prevent a person who has fallen and is lying on the track from being run over by the wheels. The commission are not yet prepared to make any specific recommendations as to the latter device, but require more time for investigation and experiment.—Chicago Jour. Com.

A Wonderful Machine.

Twenty-two years ago, in the city of Rochester, N. Y., James W. Paige began the work of constructing what at that time seemed an impossible machine. Assiduous labor, persistency of purpose, and an indomitable will finally crowned his efforts with success, and Dec. 24, 1890, in the city of Hartford, the inventor saw his work completed—a work which all who have been granted the privilege of seeing have pronounced the greatest mechanical invention of the age.

True, the machine does not talk, says the *Chicago Tribune*, but it reasons; reasons with its operator. It is a type-setting machine, and is called "The Paige Compositor," and it does the entire work of composition, setting ordinary movable type with far greater speed, accuracy and artistic effect than has ever before been accomplished by any method. The machine automatically distributes, and at the same time sets the type indicated by the operator, automatically spaces and justifies the matter without mental effort on the part of the operator, places it in a galley ready for book or newspaper, as desired, records the number of lines set, and "leads" the matter as and when required. All of this is accomplished by means of positive mechanism.

This machine is not to be confounded with any other machine, nor should it be called a mere type-setting machine. To see it in operation, to note with wonder its marvelous performance, one who understands, and even one who does not understand, the method of type-setting by the human printer, would call the machine a compositor in the truest sense of the word, as it performs simultaneously all the work of a human compositor. In an apprenticeship of less than 40 days, an operator has set 86,121 "ems" of solid, standard nonpareil in eight hours, an average of 8515 "ems" an hour. These figures are wonderful when one takes into consideration the fact that the average printer of to-day sets about 700 or 800 "ems" an hour with his time of distribution also considered. The machine, as has already been said, distributes its type while it is also setting. The work is all done simultaneously.

The machine is run by one-twelfth horse power and is now in private practical operation at Fifteenth street and Western avenue. It is probable that the directory of the World's Fair will offer one supreme prize for the best mechanical invention of the age; also one for that of electricity. For the former "The Paige Compositor" will be a competitor. That it will be the successful one is instantly and unstintingly accorded by all who have been to see it.

"I can print," says Mr. Paige, "a 200-page book, at a cost of \$5, in twenty minutes. The operator has only to watch the keyboard and copy, and the machine will do the rest. An operator can average three or four characters at each touch of the keys, and this machine is the only one in the world for which there is no excuse for an error in proof."—Chicago Journal of Commerce.

JAPAN is stated to be building a navel steel works for the manufacture of armor plates, for which £375,000 will be required. The want of a sufficient supply of good quality iron ore in Japan has been strongly urged by the opponents of the scheme, but the great wish of the nobility to make the empire independent of foreign manufacturers, in case of war, has caused this objection to be overruled.

THE Krupp Works at Essen contain 2542 furnaces, 430 boilers, 83 steam hammers, 21 roll-trains, 450 steam engines, and 1652 machines for various purposes. The number of cannon turned out is over 21,000, and more than 20,000 workmen are employed. An average of 1666 tons of coal and coke is consumed daily at the works.

SINCE the supply of natural gas began to fail and the pressure of what remained was lowered, many companies in the Eastern gas fields have been pumping it. The pumps are like the large air compressors used in mining, but with different valve arrangements suited to the nature of the gas.

SCIENTIFIC PROGRESS.

PRACTICAL USES OF GEOLOGY.—Though the practical value of geology has been, and still is, well demonstrated, there is a certain class of well-meaning persons who, from want of due consideration or lack of information, fail to see any direct benefits from the study of stones. Appended are a few hints regarding the worth and results of geology. As a statement, geology is the sum of all the sciences, the foundation, the support, the very anchor that holds the rest, for it treats of our own earth, of its birth, rise, progress and the present state. Properly studied, it embodies the complete story of life, the great history of creation, the narrative of our very existence, the record of our own planet, our present home. To be a competent geologist, one must study everything useful and economical to explain causes and effects, reasons and results. As he journeys he involuntarily studies thoroughly the country he passes through—the botany, entomology, chemistry, zoology, mineralogy, and compares them with the silent wonders he saw sculptured in the rock that lived, flourished and died thousands of years ago. Astronomy is consulted as to the formation of this earth and its companions and visitors. From the little diatom, resplendent under microscope, to the huge reptiles 75 feet long, in stony silence petrified, the boundless, natural realm of mysteries opens wide its gates. All have a wonderful tale to tell—a story often beyond the grasp of man's puny intellect. But proofs are constantly carried around with you of the uses of mineralogy and geology. The metal buttons on your clothes, the knife in your pocket, your keys, not to mention the countless array of hardware everywhere, owe their cheapness to work of the persevering follower of science. This assertion is true. It cannot be denied. There are belts and lodes of mineral in the earth that have certain limits, sure and certain manner of occurrence and regular deposition. Here the mineralogist and geologist steps in and defines them, toiling away until the rocks tell their own story of hidden treasure. By deductions, the geologist locates mineral belts, natural gas, oil, marble and minerals. It is not to be forgotten that his theories have to be tried in the crucible of experience.

LIFE SAVING BY ELECTRICITY.—A most interesting apparatus was exhibited at the last meeting of the Frankfort Electrical Society. This was a poison cupboard invented by Mr. E. G. Kubler, of Akron, Ohio, and provided with an electric safety contrivance rendering impossible on the part of the chemist any error in the sale of poisons. The cupboard, which is well executed from an artistic point of view, shows a number of compartments closed by shutters and each containing a bottle. The current is supplied by two Leclanche elements, the conductors being so arranged that they run past each compartment, terminating finally in the armature of a relay. This armature in a state of rest closes the line, going from the positive pole to a plug cord. The negative pole is connected with a spring having a hole at its end, so that, when the plug is inserted in the hole, the current is closed. The current further passes through a number of electromagnets, one being contained in each compartment, and provided with a hook, which holds up the shutter closing the compartment. On the current being closed, the shutter is released and drops. The poison bottles in the compartments stand on hubs and are provided at the bottom with matrices. Beneath the hub is a second wire, which is held down by the weight of the flask, and which on the weight being taken off interrupts the current and causes a bell to ring. It will be clear from this description that, both when a shutter is opened and when a bottle is taken out, the current is interrupted and no other shutter can be opened until the preceding one has been closed and the bottle restored to its place. By this contrivance an error is excluded with absolute certainty.—Electricity.

OIL FUEL ON LOCOMOTIVES.—The latest engine fitted with liquid fuel on the Great Eastern Railway, says a correspondent of the *Colliery Engineer*, is one of a class of ten similar express engines, and, as compared with the other nine engines doing the same round of duty, the oil burner has used about one-third the weight of coal per mile, and about as much oil as coal in weight. Her total fuel is thus about two-thirds by weight what it would be if all coal. The liquid practically gives an efficiency of double its weight of coal. The writer has had runs on this engine when burning mixtures of plain gas tar and creosote residuals, warmed up, in the tank which is placed at

the rear of the tender, to a liquidity sufficient to cause it to flow freely through the injector pipes, and to destroy its viscosity so that it would spray finely from the nozzles. Its behavior in the furnace is satisfactory, filling the firebox with white flame, while the air rings admitted of the most delicate adjustment of the supply of air to effect perfect combustion without air excess. Steam was made most freely.

A FLOATING WAVE-STILLING NET. Much interest is at present being manifested in an invention which has been submitted to the French Salvage Society by one Baron d'Allesandro. It consists in covering the surface of the sea with a specially prepared incombustible and imputrescible thin netting. This reticular fabric does not rise sensibly above the surface, and does not offer resistance to the wind; and it plays, it is claimed, the part of a bed of oil in that it has the effect of stilling the waves and rendering navigation safer and less difficult. Baron Alessandro's idea is born of the circumstance that sailors have frequently observed the calm produced by the floating seaweed technically known as *filum*, which is met with in various parts of the North sea. His netting is said to imitate exactly the nature and characteristics of this marine plant of the *Algæ* class. Experiments with the new wave-stiller have been conducted outside the breakwaters of the Quiberon Peninsula. A netting one thousand yards square, with a mesh of five centimeters, and edged with a strong bolt rope, was used; and the results obtained are stated to have been so satisfactory that the French Minister of Marine has appointed a special commission to investigate and report on the invention. *Iron*.

HIGH-PRESSURE STEAM AND INCORUSTATION.—A dangerous form of incrustation has followed the introduction of high-pressure steam. This scale is composed of fatty acids and unsaponified oils, derived from the oils used to lubricate the cylinder of the engine. These elements were communicated to the feed water when the exhaust steam from a noncondensing engine was used to heat the feed, or where the feed was drawn from the hot well of a condensing engine. The deposit was an effective nonconductor of heat, and was a most frequent cause of overheating and consequent collapse of the boiler. The substitution of a good mineral oil, with a boiling point well above the temperature of the steam, instead of the animal and vegetable oils frequently used in cylinders, was the best safeguard against the production of that very injurious form of boiler scale.—Boston Journal of Commerce.

SMOKE-PASSAGE EXPLOSIONS.—Explosions in the smoke passages of a boiler are sometimes experienced, and frequently these explosions are hard enough to tear out some of the brickwork. Explosions of this kind are caused by an accumulation of gas mixed with twice its volume of air in the smoke passages, while the damper is closed. An inspection of the boiler setting will show that there is a depression in the up-take or smoke flue leading to the chimney, allowing some of the gas generated from fresh coal in the furnace to collect in the highest part of the smoke passage before the depression is reached. In fact, the gas is trapped therein, and is held there until the damper is opened, or until the gas is ignited from the furnace. Then an explosion more or less violent takes place, perhaps doing damage to the brickwork and never doing any good to the boiler.—Tradesman.

THE latest reported aluminum-producing company is the American Aluminum Co. of Philadelphia, which proposes to produce aluminum by a process devised by Edward C. Broadwell, at a cost of 35 cents per pound. The inventor claims to be able to extract the impurities from clay and use it as his raw material.

ELECTRIC welding of street railway rails, as a substitute for fish plates, has been the subject of experiment for some time. The tests are said to prove that the necessity for joints to allow the expansion or contraction is not apparent as was believed.

GALLIUM melts at 86° F., or less than the heat of the hand. When once melted, it remains fluid even if cooled far below this temperature; but if touched with a piece of the solid metal, it solidifies at once.

SMOKELESS powder has been decided upon by the United States ordnance officials for use in both small arms and heavy ordnance.

NITRO-JUTE is a new explosive formed by treating jute with 15 times its weight of the usual nitric and sulphuric acid mixture.

ELECTRICITY.

Is Electricity a Manufactured Article?

If electricity is a manufactured article, so is the atmospheric air we breathe, and one is quite as much open to taxation as the other. Atmospheric air is utilized in various ways. Take one, for example, viz.—blast furnaces. The air which surrounds this globe of ours, and without which active natural life (animal or vegetable) cannot exist, is drawn by the blast engine into its cylinders, and there compressed and forced out through the tuyeres into the furnace with the force required to raise its contents to melting heat; it undergoes no chemical or other change; it is not manufactured by a combination of other elements; it is certainly a combination of gases, but that combination is not the result of human agency, and it is free to all creation; consequently cannot by any laws or possible course of reasoning be brought under the head of a manufactured article.

In its utilization for the above-mentioned and for hundreds of other purposes, it undergoes no change of any description, and cannot be placed in the same category as gas. Electricity is an element similar to atmospheric air. Every one who knows anything about electricity knows that it pervades everything in the universe, in a positive or negative state, and by disturbing the equilibrium which if left to itself maintains, certain effects are produced. Electrical machines, of whatever description, do not manufacture the electrical fluid. They are merely suitable forms of machines for collecting or generating (though it is a question whether the latter is a strictly correct term) the electric fluid which already exists; just as the blowing cylinder of the blast engine draws in and compresses the air, so the dynamo draws off from the surrounding earth its supply of electricity, which by careful insulation is utilized in its efforts to return to its natural condition.

Blast is conveyed by pipes from the blowing cylinder, and air vessels (when they are used) to the furnaces or to whatever other use the compressed air is to be applied. The electric current is conveyed by insulated wires and cables to whatever use it is to be applied, but man did not make the air or the electric fluid but he does make the gas, because by a mechanical process he produces it from a substance—coal—which undergoes a change and yields other substances besides gas. Neither the atmospheric air or the electric fluid undergo any change in their constituents by utilizing the energy collected, and stored in the appliances and apparatus in use at electric lighting stations, or at the blast furnaces of iron companies, and the latter could not reasonably be taxed for the supply of air drawn from nature any more than the electric fluid which is also drawn from nature.

Water works companies do not manufacture the water which they supply to the public, but all three industries derive pecuniary profit from the supply of these articles to the public, with which articles they are supplied by nature, and consequently to determine the point mooted in your article it is for legislators to decide whether setting aside the nature and description of article (atmospheric air, electricity, or water), the industry itself as a profit-producing business, taken from the same aspect as any other profit-producing business in which capital is invested, is or is not liable to taxation on the profits of the concern; if it is not taxed the chances are the public will not be supplied a whit cheaper, and if it is taxed the public will indirectly pay the tariff.—W. D. Baylis in *Discovery*.

An electric device for clearing a track of obstructions is among the newest ideas. It consists of a triangular steel folding frame over which a net is stretched. This is placed on the front of a locomotive and can be opened at will, catching the obstructions upon it. An additional arrangement is a scoop to drop on the track. The recent tests were very satisfactory.

ELECTRICITY is in successful use at the gun factory at St. Etienne, France, for tempering gun springs. The latter consists of steel wire which is wound spirally, and a current of 45 volts and 23 amperes is passed through it. When the required temperature is reached the current is interrupted and the spring falls into water. One workman can temper 2400 springs per day by this method.

THIS year's appropriation for Chicago street lighting is causing the city officers some close figuring. It costs \$56,000 to operate the South Side electric light plants. Comptroller May says that he has only \$50,000 available for that purpose.

ELECTRICAL ACTION OF THE HUMAN BODY.—In the course of a series of lectures delivered by Prof. McKendrick before the Royal Institution of London, the speaker showed some interesting experiments to demonstrate that there was in reality a distinct electrical action of the human body. He showed the effect of animal electrical currents by means of a very sensitive galvanometer. Current from animals such as the torpedo fish had long been known, he said, but it was much disputed whether there was such a thing as an electric current from man. This man-current he demonstrated by putting his hands into a three-quarter per cent solution of common salt contained in two flat vulcanite dishes. The effect upon the galvanometer was greater as the number of fingers inserted was increased, and was greatest when the muscles of the arm were contracted. There were no fewer than 50 species of animals that were living electric batteries, the speaker declared, although only five or six were generally known.

NIAGARA ELECTRIC SCHEME.—George Forbes, M. A., the world-renowned electrical engineer and expert of London, has arrived at Niagara Falls to inspect the Canadian side of the river relative to constructing a gigantic tunnel to produce electrical transmission to large manufacturing centers. Prof. Forbes was one of the competitors in the International Niagara competition in London last year, and presented a plan for transmission of electrical power to Buffalo from the falls by the use of an alternating current, which plan has commanded the attention of the electrical world. It is the intention of a Canadian company to develop electrical or pneumatic power by means of the tunnel. To show how much cheaper this power can be produced on the Canadian side as compared with the American, it is roughly estimated that a tunnel 800 feet in length over there will produce as much power as the American tunnel 7000 feet long.

THE longest distance to which electrical power is actually transmitted for electric lighting in the United States is about 13 miles. A plant of several thousand incandescent lamps in Portland, Oregon, is supplied with current for generators at the falls of the Willamette river. An alternating current of 5000 volts potential is employed. Quite recently it is reported that the Westinghouse Co. of Pittsburgh, which designed and erected the Portland plant, has contracted for another one at Pomona, in Southern California, in which about 1000-horse power is to be conveyed 15 miles, at a pressure of 10,000 volts. This plant, if successful, and there appears no reason why it should not be, will constitute a notable achievement in electrodynamics.

A LONG SPAN TELEPHONE WIRE.—A subscriber who has read the note in the issue of the *Electrical World* of April 9th about the 2400-foot span across the River Dart in England, calls attention to two telephone lines which cross the Ohio river between Portsmouth, O., and South Portsmouth, Ky., connecting the latter city with the Portsmouth telephone exchange. The wires at this point span the river from the pole on the Ohio side, measuring 102 feet above ground, to the Kentucky hills on the opposite side, the distance being 3773 feet between poles. The wire is made of steel and its size is No. 12 gauge.

MR. H. J. WELLS, superintendent of the Osceola Light Company, Osceola, Pa., reports that a Sawyer-Man lamp on one of the circuits of that company has just closed a remarkable record. The lamp in question was constructed for a pressure of 110 volts, and was run as nearly as possible at that voltage. Its normal brilliancy was 32-candle power. The lamp was placed in circuit February 22, 1890, and remained in service with an average use of 8½ hours per day until March 5, 1892.

THE Chicago Telephone Company was given permission by the City Council to put electric conduits under the streets and alleys of the city. For this and the right to string wires on poles the company paid into the city treasury during 1891 the sum of \$26,255.67, being 3 per cent on the gross receipts.

A GREAT feat in the electrical transmission of power is to be undertaken in Southern California, where a contract has been closed for transmitting 1000-horse power a distance of 15 to 30 miles in the neighborhood of Pomona.

Two Swedish astronomers, Lemstrom and Trumbolt, are reported to have produced artificial auroras by means of a network of electric currents between two mountains.

GOOD HEALTH.

Night Air and Malaria.

"Ever since I can remember, I've heard changes rung on the necessity for sitting in doors at night, especially in malarial districts. To walk about much in the evening was deadly. To sit on the porch or door step was to take one's life in one's hands, while riding or driving were only permitted as matters of necessity, and the team generally went home against time, in order to get us in out of the night air.

Now, the physician comes in here and attends a patient suffering from a malarial disease, and after divers and sundry other directions, tells us, that, whatever we do, we must not shut fresh air out of the sick-room, even at night, but must have the windows so arranged that the ventilation will be as nearly perfect as possible.

Now, this is a malarial locality, at all events it is considered so, and the patient contracted whatever disease there may be, just here. If you will tell me what difference there is between breathing night air indoors, and night air out of doors, it will relieve my mind of great anxiety. We would no more think of spending the night, or any portion of it, in the hammock on the porch than we would of seeking suicide in any other direction, and yet here is this medical authority insisting that we bring indoors the very elements that we are supposed to stay in the house in order to avoid.

Now, don't understand that I am quarreling with anybody's notion on the importance of fresh air, for I am not, but I am trying to make up my mind why so much is said against spending a little time out of doors in the evening, and so much in favor of bringing the same atmosphere into the house. For my part, I think that a great deal of the danger from night air comes from the fact that people go out without sufficient wrappings. I think that I could spend half of my evenings on the piazza, and not receive the slightest injury, if I protected myself in a proper way, but I should wear a cloak as thick as the one I use in mid-winter, and should keep a hood or light shawl over my head all of the time. I once spent a season in one of the worst malarial districts I ever knew. It was confidently predicted by every one who knew me, that I would have malaria-fever, because I insisted on sitting out on the porch of evenings, but I always put on a jacket, and then wrapped myself in a mackintosh with a hood pulled over so as to cover all but my face. I didn't catch cold, nor did I have an ache or a pain either that season or the next. Almost every one around there had ague and chills and fever and aches of all sorts, but I assure you that the sick ones were those who went out without wrappings, and always declared: "Oh, it won't hurt me to go out a little while; I never take cold," but they took the consequences of their imprudence, and some of them paid for their folly with their lives. This and similar experiences have fully satisfied me that it is less what you do than the way you do it, which preserves the health; therefore, I am going to obey the doctor's orders and open the windows, but they will not be the windows of the sick-room. I shall let in the air to the other rooms first, and ventilate entirely in what you might call a secondary fashion. I shall also take the precaution to put an extra blanket over the sufferer, or, what is often better, a very thick linen sheet, which is a more complete protection under such circumstances than the heaviest blanket."—New York Ledger.

A PURER CHLOROFORM than has yet been available, by virtue of its purity, is claimed to be produced by the Swiss scientist, Pictet, by a process of artificial refrigeration that precipitates a quantity of deleterious impurities. It is moreover claimed that the physiological effects of the impurities removed by Pictet's process when isolated have been such as to show their deleterious quality beyond doubt. If this be all as stated, the use of chloroform in surgery, the benefits of which are simply incalculable, may become free from some dangers hitherto attending its administration. The use of intense cold for purifying and separating chemical substances is still in its infancy, though for the extraction of menthol and similar substances from essential oils it has been for some years employed.

THE number of persons who approve of cremation seems to be steadily increasing. From the report of the Cremation Society of England for 1891, we learn that in 1885, the first year a crematorium was used, only three bodies were sent there; in 1886 the number was 10; in 1887, 13; in 1888, 28; in 1889, 46; in 1890, 54; and during last year, 99.

USEFUL INFORMATION.

A HEAVY experimental freight train, consisting of 40 cars loaded with 66,000 lbs., or 33 tons, of grain each, being 6000 lbs. per car over their normal capacity, was run through from Chicago to Philadelphia last week on about the usual schedule, four days time, with speeds of 15 miles per hour. The idea was to test the cars in use with a view to constructing cars of still greater capacity, and also the necessary cost of handling grain. The total paying load was 1320 tons, dead load of cars about 520 tons, of engine and tender say 80 tons, making 1920 tons. The train was handled chiefly by one engine, with an assistant engine over the heavy grade sections. According to average American experience one engine can handle a train like this on a 0.8 per cent grade (42 feet per mile).

FROM the reports and estimates prepared by the Exposition authorities for the Congressional Investigating Committee the following interesting facts, among many others, appear: To complete the Exposition and conduct it to its close will require of the Directory a total expenditure of \$22,246,403. Up to March 1st, the total expenditure was \$3,860,934. The liabilities under contracts already made are \$4,692,724. The receipts have been \$6,252,404, and the amount due from stock subscriptions and city bonds, \$5,713,051. The National Commission has expended \$184,522, and estimates that \$1,067,983 more is needed, including \$700,000 for awards. The lady managers have spent \$57,811 and think they require \$227,574 more up to the close of the fair.

DETECTING SUSPENDED ANIMATION.—A French paper reports that the microphone has been successfully used in St. Petersburg in a case of suspended animation, where the patient was given up for dead. As a last resort the physician applied a microphone to the region of the heart, and was enabled by this instrument to hear a faint beating, which proved that life was not extinct. Everything was done to resuscitate the patient, who shortly afterward recovered consciousness.

AT the mouth of Nehalem river, on the coast of Oregon, is washed ashore at high tide, a substance having the appearance of a mineral and the qualities of fine beeswax. It is also found on shore in black soil where trees are growing, at considerable elevations above the water. It is sold in Astoria at the regular price of beeswax. It belongs to the hydrocarbon series, allied to amber, a fossil remain of the resinous trees of the tertiary age.

COPPER and German silver wire .002 inch in diameter, of which it takes ten miles to weigh a pound, is used in the delicate receiving instruments for ocean cables, testing galvanometers, etc. Small as the wire is, it is wound with two layers of silk thread smaller in diameter than the wire. The wire is made by drawing through drilled diamonds.

OIL is apparently to be used instead of coal under the furnaces at the World's Columbian Exposition. The lowest offer for coal was \$2.44 per ton, while the Standard Oil Company offered oil at 70 cents per barrel of 42 gallons. It is claimed that three barrel of oil equal one ton of coal in heat-producing power.

THE usual mode of "galvanizing" iron or steel plates, wire, chains, etc., is by dipping in molten zinc. A new method, which is being introduced in England, and is said to possess advantages, is by electro-deposition of the zinc on the iron or steel from a cold solution.

A NEW method of steel making, called the "direct" process, in use at the Homestead Steel Works, Pa., is in part a trade secret. It is reported that by it a workman can make four heats to a turn, whereas, under the old method, he could make only two.

PLATINUM ore is reported discovered in the Black Hills, at a point about 25 miles west of Rapid City. The great use of the metal for electrical and chemical work make the discovery of new sources of supply a matter of much importance.

HORSESHOES of rubber set in a metal frame are said to be useful on asphalt or other smooth pavement.

THE entire number of engineering schools, so-called, in the United States is 94.

THE manufacture of nickel-steel alloy for armor plates is being extended.



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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO:

SATURDAY, MAY 28, 1892.

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Come to Judgment at Last.

In the suit of W. M. Fox against the directors of the Hale & Norcross Mining Co., Judge Hebbard on Thursday rendered a decision in favor of the plaintiff for \$1,011,835 damages. He appointed a receiver to calculate the personal liability of each director, and holds each director for his proportionate share of the money taken while acting as director of the company. A conspiracy having been proven, the mill company was not entitled to any profit, and will be made to return \$2.50 per ton excessive charge.

It was a long time before this suit came to trial, but when it did, some very startling developments were made. We published the testimony during the progress of the suit.

For years the Comstock mines have been mismanaged, and this is the first time that the directors of any of the companies have been brought to judgment. The decision is rendered just as we go to press, so we have not the details. The directors did not look out for the interests of the stockholders as they did for their own, and now they must pay for it. The mill people, by connivance of the directors, got the money the stockholders should have had. It is probable that the result of this suit will clear up the moral atmosphere of Comstock mine management, and the stockholders will have a better show in the future. Mr. Fox deserves credit for his bold stand and perseverance.

THE daily papers are once more paying some attention to the mining interests, which is a good sign for the miners' cause.

The Local Engineers.

During the recent long-continued molders' strike, the foundrymen of this city were brought closely together through their association, unity of action being made necessary by force of circumstances. Only the proprietors, however, took active part in the fight.

During the recent visit of the American Society of Mechanical Engineers to this city, the local mechanical engineers and those interested in the various branches of mechanical industry were brought in friendly contact with each other and with the visitors. The effort this time was in a pleasant direction, all trying to assist in suitably entertaining the guests.

It is to be hoped that the result of this will be to form closer social relations than have formerly existed. Rivalry in business, within proper degrees, is right and proper, but it need not necessarily estrange those in different shops or works, or make them wary of each other when they meet.

The mechanical engineers here, in the various branches, should mingle with each other more than they do, and become better acquainted personally. Petty jealousies do not become men of such an earnest profession.

On the day of the trip to the big Spring Valley dam, when Geo. W. Dickie, of the Union Iron Works, was called on for a speech, he dwelt on this topic and expressed a desire to see closer relations among the local engineers. During this visit he confessed he had seen more of his professional brethren than had been the case for years, though living in the same city and engaged in the same occupations. He hoped that the visit of the society they were entertaining would result in establishing friendlier relations among the mechanical engineers of California.

When the manager of the largest industrial establishment on this coast, and one of the most experienced and skilled mechanical engineers, expresses this opinion and desire, it would seem as if others in the profession should pay heed. Isolated as they are from the great industrial centers of the East, they have a community of interest here which should be better recognized and made stronger.

It did not seem to require any very strong effort to sink individuality when entertaining the guests. Nobody wanted to take any advantage in pushing himself to the front, and all worked to a common end in making the various entertainments successful.

Personal ability is bound to find recognition in any branch, and in none less than mechanical engineering. Personal experience and knowledge are valuable to every man, but it is only the narrow-minded one who declines to impart it to others. In the engineering societies the papers read at the meetings are usually the result of labor and study in special lines, and are prepared for the benefit of others in the same branch of the profession. The men who succeed, and acquire fame, are those who spread their knowledge, not those who are wrapped up in self. Contact with skilled and experienced men is useful not only to the tyro, but to those who are also skilled and experienced.

Our local mechanical engineers have kept too much to themselves, and it is time for a change in this respect. The Technical Society of the Pacific Coast is a good center in which to gather. By joining and attending its meetings regularly, reading a paper occasionally, and having a social dinner once in a while, many pleasant acquaintances may be made and more or less information be gained as well. But whether members of this society or not, let each make up his mind to be more social with his professional brethren in the future, and it will be better for all young and old. When such men as George W. Dickie, Irving M. Scott, John

Richards, Wm. R. Eckart, James Spiers, Robert S. Moore, Patrick Noble, Herman Schussler, H. J. Small, and Marsden Manson show such a disposition as they do in this direction, all the others can well afford to join hands.

The Cyanide Process.

No metallurgical improvement of late years has attracted as much attention from the mining public as the MacArthur-Forrest process, known also as the cyanide process. It is of English origin, but the rights in this country are owned by an American company with headquarters at Denver, Col. The rights in this State and Nevada are owned by a San Francisco company. Several plants are in operation and a number more are being erected for working ores on this system.

The principal feature of the process as far as it relates to gold ores is that it treats the whole mass of ore, sulphurets and all, at one operation, whereas by the ordinary milling method the sulphurets have to be taken out and worked by another process, after the free gold has been recovered by amalgamation. The percentage secured is quite high. Outside of the usual crushing appliances no machinery is required, the process being conducted in vats or tubs.

In view of the great interest shown in this process it is our intention during the coming month to publish a special edition embodying all the obtainable information on the subject. We have already printed a great deal concerning the process and have been unable to supply the demand for copies of all the articles. We intend, therefore, to republish more or less of that which has already appeared together with certain new matter, in the special edition referred to. Mining and millmen who desire full information on this subject will do well to send in their orders for copies of the special edition, in which they will find all available information concerning the cyanide process.

The Editors and the Mines.

The visiting editors go this week to Dutch Flat, where they will be shown the systems of gravel mining, including that by the hydraulic process, and will then go to Grass Valley and Nevada City to see the quartz mines and mills.

This is the first time that any body of visitors to California have been taken to the mines. They are shown all our other industries but the mines have been neglected. For once, however, the honest miner is not forgotten, and the visitors will be shown something they will remember better than the orange groves, orchards and gardens of the State. They can see some of these things at home, but have no opportunity to see an immense stream of water tearing down the gravel to set the gold free. They will be shown how the miners live and work and how the gold they all yearn for is obtained.

This instructive object lesson will do them all good, and doubtless they will all write more or less about it, so it may result in good to us of California as well.

In his official report of the operations in the Consolidated California and Virginia mine for the present week, and also in his weekly reports in the future, Superintendent Lyman, acting under instructions from the home office, gives the average assay value of the railroad car samples of the ore extracted and sent to the mill, as well as the average battery assay value of the ore mined during the week.

THE California Miners' Association Committee to accompany the National Editorial Association party to Dutch Flat and Grass Valley, consists of Messrs. Jacob Neff, S. K. Thornton, W. O. Ralston, Henry Martin, H. W. Meade and Charles G. Yale (of the MINING AND SCIENTIFIC PRESS).

Reception to Judge Searles.

Judge Niles Searles, chairman of the delegation sent to Washington to the California Miners Association, to advocate the miners cause before Congress was given a public reception at Nevada City on Monday. The people of the whole county joined in the demonstration, which was a hearty cordial welcome. Hydraulic Parlor, Native Sons of the Golden West acted as escort to the theatre where the reception took place. The stage had been nicely decorated by the Native Daughters with stands of the choicest flowers. Resting upon an easel was a large oil painting of Judge Searles, and above the centre of the platform was suspended the beautiful banner of Hydraulic Parlor, having for a background two large American flags. On the right of the stage was a hydraulic monitor.

Fred E. Brown, President of Hydraulic Parlor, called the meeting to order, which opened with music by the band, followed by a chorus, "By the Seaside," by the choir, under the direction of John Werry.

The Secretary, John C. Nilon, read off the list of vice-presidents, the gentleman named being invited to seats upon the platform. Major J. S. McBride of North San Juan was then introduced as chairman of the meeting. The Major very neatly acknowledged the honor conferred upon him, and in setting forth the object of the meeting made a good speech. Upon the conclusion of his remarks Frank T. Nilon, the District Attorney, was introduced and delivered the address of welcome.

In responding, Judge Searles expressed himself as feeling greatly honored at the cordial welcome he had been given, and said that he felt that he was being too highly honored for what he had done; in other words, he felt as if he was obtaining goods under false pretenses. He gave an outline of the work performed by the miners' delegation at Washington, telling of some of the principal obstacles met with and how they were overcome, and how the way was paved for the Mining bill before its introduction in Congress. He paid a magnificent tribute to Secretary of War Elkins, saying that physically he weighed over 200 pounds and intellectually he weighed over four tons; that he could in two hours time grasp and solve a proposition that an ordinary man would take two months to consider. Secretary Elkins had treated the mining delegation very kindly, and it was through him that an appropriation was recommended. Judge Searles also gave much credit and praise to Governor Markham for the able assistance he had given the commission before their departure for Washington, and also during their sojourn in the national capital. All the other members of the commission, Hobson, McMurray, Luttrell and McLaughlin, came in for a full share of credit for what had been done, and Senator Felton and Congressman Caminetti each received from the speaker their measure of praise for the zealous assistance they had given in promoting the cause of the miners. Judge Searles gave it as his opinion that if the bill for the construction of restraining dams was not passed at this session of Congress he believed it surely would be at the next session. In concluding his remarks the Judge said that he intended to make Nevada City his home during the remainder of his days. He had been a resident of the county forty-three years and had always labored for its best interests, and always would. He thanked the people for what they had done for him and for the very kind manner in which they had shown their appreciation of his efforts at Washington.

THE BRANCH LINE of the Oakland Consolidated Company's electric road to the Sixteenth-street depot was opened Monday for regular traffic. It connects with the main road at Sixteenth and Grove streets.

A Mining Display at the State Fair.

The State Board of Agriculture met this week with the Citizen's Industrial Association of Sacramento, to arrange matters in connection with the coming State Fair. Among other things they intend to form an extensive and varied State exhibit of minerals, quartz, agate, building stone; etc.

In the formation of this exhibit the aid of William Irelan and the State Mining Bureau will be asked, and as they have at all times showed their willingness to take hold of and complete an exhibit of this character, it is expected that this will be a strong feature in this year's exposition.

There is also to be a mining display. The space to be allotted this exhibit of one of California's principal resources will be the entire northeast court, embracing an open area of 160 feet square, or 25,900 square feet, wherein it is proposed to show as far as possible, the mining industry, from the taking of the crude rock from its natural bed, and its passage through crushers, amalgamators, stamp mills and all other machinery and paraphernalia used in the extraction of gold and silver.

The State Board named the following Committee on Consultation with reference to said committee: Chris Green, representing the board; Messrs. Lubin, Steffens, Van Voorhies, Coleman and Hall from the Industrial Association, and Hon. J. A. Filcher of Placer, Hon. J. H. Neff and Chas. H. Mitchell of Nevada.

It being understood that most of this committee would be in Nevada City on Saturday of this week, it was suggested that a meeting be then held for the furtherance of this important matter.

The State Board has from time to time contemplated an exhibit of this character, as they believe it due to the mining interest that a full exhibit of this industry be made this year as a preliminary of the great exhibit to be made in 1893 at Chicago.

A MONSTER CABLE.—The largest wire rope ever made in this city by the California Wire Works was hauled by 60 horses up Market street, on Friday of last week, to the power-house of the Ellis street cable line. The cable was manufactured in the remarkably fast time of 52 hours, and surpasses all other undertakings of a similar nature by any wire works in the United States. The rope is 29,020 feet in length and cost the cable company in the neighborhood of \$8000. It is 1½ inches in diameter and weighs 72,830 pounds. The reel weighed 6000 pounds and the truck 30,000 pounds. The gross weight hauled by the 60 horses was 108,830 pounds. The rope is to be kept in reserve in case of an accident.

THE Butte & Boston Company, through its general manager, Captain C. H. Palmer, has negotiated the purchase of the Mountain Chief mine from Eugene D. Sullivan and Charles Nuss. The price is understood to be \$75,000, and from all reports the Butte & Boston people have acquired a good property for a low figure. The Mountain Chief lies immediately north of the Modoc, and is one of the oldest patented claims in Summit Valley district, Montana.

CŒUR D'ALENE.—Colonel Blunt of Fort Douglass has been ordered by the War Department to hold his command in readiness to march at an hour's notice to the scene of the mining troubles in the Cœur d'Alenes. The Governor of Idaho has gone to Wallace to investigate and prepare a statement for the benefit of the public.

THE Executive Committee of the California Miners' Association met on Thursday of this week to receive reports from Washington.

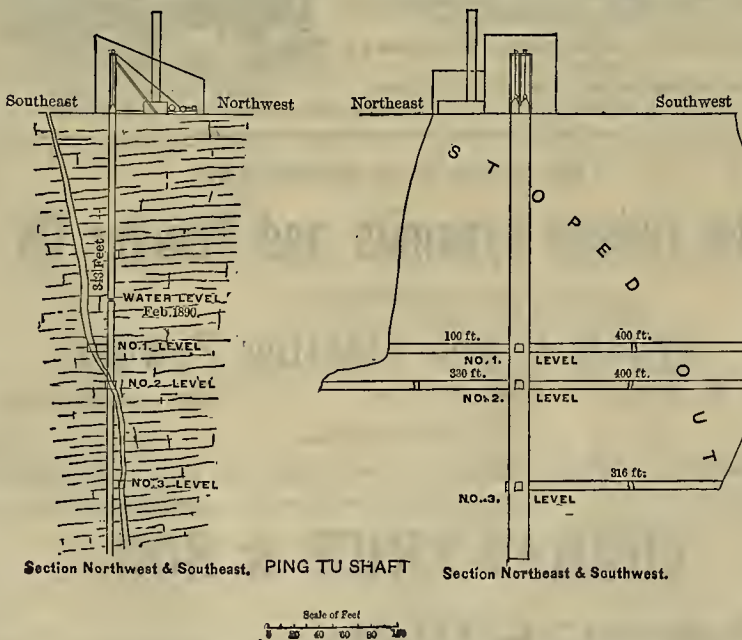
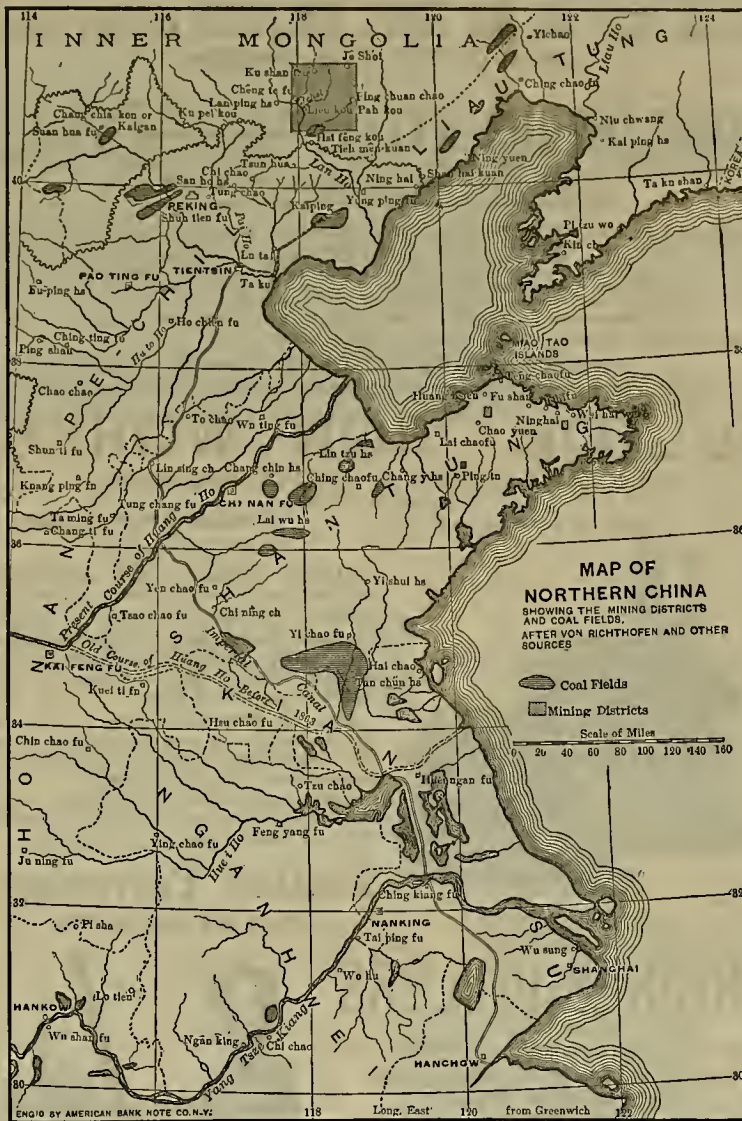
BOTH Messrs. Searles and Hobson of the miners' committee to Congress have returned home, leaving only Mr. Luttrell at Washington.

The Mechanical Engineers' Visit.

The members of the American Society of Mechanical Engineers, who have been visiting California, have started homeward. All were pleased with their visit. They especially appreciated the attention paid to them in Sacramento and San Francisco, where they had every opportunity to ex-

fact, they were left but little time to themselves, their stay here being so short. The sessions of the Society were held in the evening, the days being devoted to visiting industrial establishments and points of interest on the peninsula and about the bay.

The trips to the cable-engine houses, the Spring Valley dam, the Union Iron Works, and Pacific Rolling Mills, and the Sacra-



amine all that might interest them. The facilities placed at their disposal enabled them to see in a short time that which might have taken many days under less favorable circumstances.

The arrangements made by the local Executive Committee of the foundry and iron trades, before the arrival of the party from the East, were such as to give the visitors plenty to do in the way of sight-seeing. In

mento railroad shops, were all instructive as indicating the scope of our work here. The visits to Sutro Heights and Cliff House and the tugboat excursion around the bay and to Mare Island, were particularly enjoyed by the ladies of the party. The reception by Mrs. A. S. Hallidie, and the lunch by Mrs. James Spiers of Berkeley, were also prepared for the lady visitors.

On the last evening here, Mr. W. R.

Eckart gave a lantern exhibition, illustrating the mechanical progress of California. The slides have been presented to the Society, together with the descriptive notes.

Altogether, the visit was a success in every way. The engineers greatly appreciated the attention bestowed upon them by their brethren here, and on the evening of their last session adopted a series of resolutions, thanking by name all those persons and companies who had entertained them so pleasantly.

Mining in China.

In last week's PRESS a brief sketch was given of some of the mining districts in China, including the Ping-Tu gold district. A sketch is here given of the Ping-Tu shaft. The vein varies in width from four to ten feet, and consists of quartz mineralized in the upper levels with carbonate of iron, and in depth with pyrites, some galena and a little copper-pyrites. In two years the product of the mill, with its sixteen concentrators, amounted to 1,500 tons of concentrates, samples of which, taken from different parts of the pile, assayed from \$28.77 up to \$70.94 per ton. An average of the pile assayed in gold \$36.31; silver \$2.94; total, \$39.25 a ton. Small chlorination works furnished with one reverberatory, a chlorine generator, and two chlorinating and precipitating vats has been erected. Its daily capacity is one ton, and about 100 tons of ore have been treated; but the process at first conducted under European supervision, was not a success, as the residues contained \$26.87 in gold and \$10.70 in silver per ton, so that if the richest concentrates—sample 5 of the assay, for example—were treated, about half the precious metals would be left in the residues. It is possible that the comparative coarseness of the concentrates and the low fineness of the gold, and large proportion of silver may be responsible for this failure.

The Ping-Tu mine is probably better equipped than any other metal-mine in North China; besides the fine hoisting-works and pumping-machinery, it has an 18-inch tramway, 1,600 feet long, running to the mill, a well-appointed assay-office, with a quicksilver retort, pumping-machinery for the stamp-heads, and a ditch supplying water to the concentrators; a dynamite factory with a capacity of 600 pounds per day and a foreign two-storied house with glass windows and board floors, which is a structure rarely met with in China outside the treaty ports and missionary stations.

Deposits of ores of gold, silver, copper and lead are found at Chi-Chaw, on the Yang Tse Kiang, shown on the accompanying map; in the Shantung promontory, at Ning-Hai, Ping-Tu and Chao-Yuen; in the Ping-Chuan-Chao district, the Je-Shui district, and the Jehol district, the latter including the silver-lead mines of Yen-Tung-Shan and Ku-Shan-Tzu. Mr. Clark, who wrote the paper from which we quote, visited all these places professionally and examined the mining properties.

IRON AND STEEL.—The annual statistical report of the American Iron and Steel Association, just issued, says: "The production of pig iron in 1891 was 1,033,573 net tons less than in 1890; a decrease of 10 per cent. The production of Bessemer steel ingots was 494,428 net tons less, a decrease of 12 per cent. The production of open-hearth steel was 649,323 tons, an increase of nearly 13 per cent. The production of Bessemer steel rails was 649,759 net tons less than it was in 1890, a decrease of over 30 per cent, but the production of all rolled iron and steel other than rails was only 60,235 tons less than in 1890. The production of iron and steel-cut nails in 1891 was 638,770 kegs less than in 1890, but the production of wire nails was 978,474 kegs, and of wire rods 89,049 net tons greater than in 1890.

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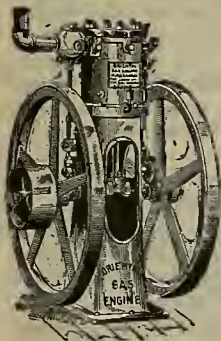
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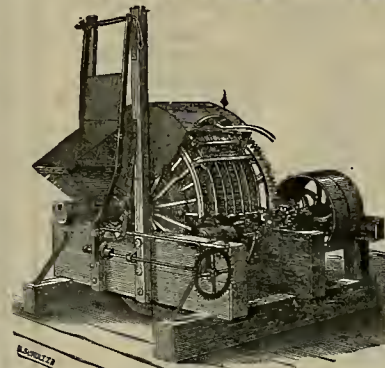
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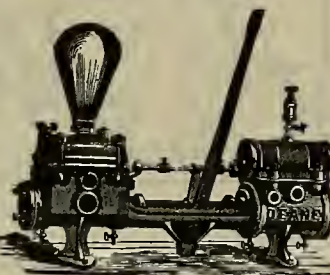
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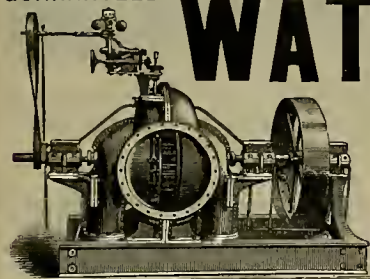
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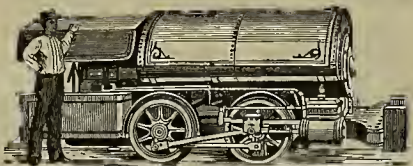
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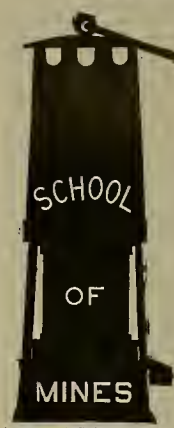
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 26, 1892.

General trade continues fair. The weather still has considerable influence on trade, but so far it has been favorable. If in the month of June the weather continues favorable for crops, then we can reasonably look for prosperous times the remainder of the year, notwithstanding that this is a presidential election year. At the East general trade is reported dull, owing to adverse weather and only fair crop prospects. In the local market, money continues in liberal supply, yet only regular customers and persons offering undoubted security are able to get accommodations. There is no call for funds for speculative purposes, and a very light call for legitimate trade or business requirements. It is claimed that when new crop grain begins to move that there will be an active call for money, yet the bulk of requirements will be met by interior capitalists and bankers.

Eastern and European mail advices report money very easy at low rates of interest. There is an almost total absence of any speculative movements, while trade and general business continue to run in the rut into which they have been working for some time past. New York mail advices report an increasing demand for investments and not speculative security. The former are said to be scarce.

SILVER.—The market for silver continues to be an anomaly. The statistical position of the metal ought to send prices up, but then it does not. The markets are very sensitive, for when any news comes in, prices advance, but with this news, prices fall back. It looks very much as if the markets are manipulated to make them look as bad as possible, but whether this is being done for the purpose of concentrating leading speculative securities, whose market values are based on the price of silver, is an open question. If this is the case, then it is not at all unlikely but what we will witness much better prices before the year passes. Everything nowadays appears to be a gamble. This condition is largely instrumental in producing metallic accidents, and the retiring of men of brains and business sagacity. The silver market in this country is passing through the throes of uncertainty, made so by moneyed and also political combinations. Whether a more stable market value will be given to the metal remains to be seen, but it now seems more than probable that such a desideratum will be attained. Silver leagues are being formed in Colorado, South Dakota, Idaho, Washington, Montana, Oregon, Nevada and also in this State. These leagues, if they stand solid, will unquestionably control the coming presidential election. Beside silver leagues on this coast, cotton leagues will be or are being organized in the Southern States, and corn or wheat leagues in the Central States, whose aim is to promote bimetallism. With such formidable organizations working in harmony with one object in view, it is only reasonable to expect that success will crown their efforts. European mail advices are more encouraging for bimetallists. It now looks as if an international conference will be held to discuss and, if possible, to arrive at a favorable conclusion on the silver problem.

MEXICAN DOLLARS.—The market is firm at around 69 1/2 cts. There is a growing conviction that the market will soon begin to improve.

BORAX.—Receipts the past week aggregate 219 cts. The market at the East is reported fairly active with more liberal supplies coming and slight concessions obtainable. Shipments overland in April aggregated 146 tons.

QUICKSILVER.—Receipts the past week aggregate 301 flasks. It is claimed that the market is easier yet we are not able to get lower quotations. Overland shipments in April aggregated 33 tons.

LIME.—Receipts the past week aggregate 3,147 bbls. The market is essentially unchanged.

FIG LEAD.—The market is said to have a stronger tone in sympathy with the East when it is claimed that the Idaho mining troubles cause a scarcity of ores in some quarters that is rather threatening, and that late accumulations of pig lead, it is reported, have been cut down considerably, so that the surroundings look favorable for a strong market.

FIG TIN.—The consumption demand in this market is only fair. On the 18th, 171 pigs were received from San Diego. Eastern mail advices continue bullish. Importations are heavy, yet prices do not go down. Shipments of Straits to England, America and the Continent, continue very light which cause a steady decrease in stocks.

FIG IRON.—The market shows increasing firmness. It should not cause surprise if an advance was established at an early day. In Great Britain the market is higher, owing to lighter stocks, while at the East increasing business is very generally reported. Well-informed Eastern writers claim that bottom prices have been touched. Agricultural implement makers are not buying much finished iron and steel, owing to unfavorable crop prospects, which exert an unfavorable influence on pig.

COPPER.—The market is steady, but firm. Overland shipments in April aggregated 32 tons of copper cement from Stockton. The expected decline at the East on the opening of lake navigation did not materialize. Owing to heavy shipments by "rail" in the winter months, there was very little copper for shipment when lake navigation was resumed. London cables the *Iron Age* of May 19th report as follows: "Copper is firmer. During the latter portion of the week, there has been more speculative and freer purchases for consumption, which, together with favorable advices from America and more inquiry from the continent, restores confidence."

COAL.—Imports the past week aggregate as follows: Liverpool, 1522 tons; Departure Bay, 3649; Sydney, 2270; Nanaimo, 7355; Tacoma, 14400. Total, 19,196 tons. The market is reported unchanged. Continued favorable crop weather causes dealers to act with caution and not anticipate wants to any great extent unless offered inducements. Unless the weather in June should be unfavorable to growing wheat, we can reasonably expect a large addition to the coal fleet bound for this port for wheat cargoes.

Eastern Metal Markets.

New York, May 26.—The following are the closing prices the past week:

	Silver in London	Silver in New York	Copper	Lead	Tin
Thursday.....	40 3-16	87 1/2	11 95	4 2 1/2	21 10
Friday.....	40 1/2	88	11 95	4 2 1/2	21 10
Saturday.....	40 1/2	88 1/2	11 95	4 2 1/2	21 10
Monday.....	40 1/2	87 1/2	11 95	4 2 1/2	21 10
Tuesday.....	40 1/2	87 1/2	11 95	4 2 1/2	21 10
Wednesday.....	40 1/2	87 1/2	11 95	4 2 1/2	21 10

Quicksilver is easy. Borax is in liberal supply and easier. Pig tin is very strong under manipulation. Pig iron is barely steady. Copper is firm but not quotable higher. Lead is quiet but steady.

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Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 3.	WEEK ENDING May 12.	WEEK ENDING May 17.	WEEK ENDING May 24.
Alpha.....	.15	.30	.20	.40
Alta.....	.70	.75	.70	.75
Andes.....	.65	.60	.70	.60
Belle Isle.....	1.35	1.20	1.35	1.10
Belcher.....	.15	.15	.15	.25
Best & Belcher.....	2.20	2.35	2.10	2.5
Bullion.....	1.05	1.50	1.05	1.30
Bodie Con.....	.30	.35	.35	.40
Bulwer.....	.35	.40	.40	.55
Commonwealth.....	.15	.15	.20	.25
Oon. Va. & Cal.....	3.85	4.10	3.55	4.45
Challenger.....	.60	.75	.60	.65
Crocker.....	1.85	1.05	.85	1.05
Confidence.....	1.25	2.30	.35	.40
Oon. Imperial.....	.15	.05	.15	.05
Calatonia.....	.20	.25	.30	.25
Crown Point.....	1.15	1.25	1.15	1.35
Ocker.....	.20	.25	.20	.15
Del Monte.....	.20	.25	.20	.15
Eureka Con.....	.35	.40	.35	.30
Exchequer.....	.35	.40	.35	.30
Grand Prize.....	.15	.15	.15	.15
Gould & Curry.....	1.35	1.45	1.30	1.40
Hale & Norcross.....	1.35	1.45	1.30	1.40
Julia.....	.10	.10	.10	.15
Justice.....	.15	.20	.15	.20
Kentuck.....	.10	.15	.15	.15
Lady Wash.....	.10	.15	.15	.15
Mono.....	.70	.75	.70	.60
Mexican.....	1.40	1.65	1.45	1.85
Navajo.....	.15	.25	.10	.10
North Belle Isle.....	.15	.25	.10	.10
Nev. Queo.....	.95	1.10	.95	1.10
Occidental.....	.10	.15	.15	.15
Ophir.....	2.20	2.40	2.25	2.50
Overman.....	.70	.75	.65	.55
Potosi.....	1.05	1.10	1.10	1.30
Peerless.....	.05	.05	.05	.05
Peer.....	.15	.15	.15	.15
Savage.....	1.30	1.40	1.25	1.50
S. B. & M.....	1.20	1.40	1.30	1.50
Sierra Nevada.....	1.20	1.40	1.30	1.50
Silver Hill.....	.10	.10	.10	.10
Scorpion.....	1.10	1.35	1.20	1.40
Union Con.....	.35	.35	.40	.30
Yellow Jacket.....	.80	1.10	.75	.80

*Assessment added.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.	BORAX.....	14	English, D.....
Refined, in car lots.....	8	8	Canton tool.....
Powdered, do.....	8	8	3 1/2 Dia d tool.....
Concentrated, do.....	72	72	Pick & Hammer.....
All grades jobbing at advance.	72	72	Machinery.....
COPPER.		DO. CALK.....	
Bolt.....	22	22	FIG IRON.
Sheathing.....	22	22	Spot, Load.....
Ingot, jobbing.....	14 1/2	14 1/2	U. S. ton.....
Do, wholesale.....	13 1/2	13 1/2	Glenagrock.....
Fire Box Sheet.....	24	24	Am. Soft, No. 1.....
IRON.		Oregon Pig.....	
Bar, base.....	3	3	Pure Sound.....
Norway, base.....	4 1/2	4 1/2	Clay Lane White.....
FIG IRON.		Langlois.....	
Spot, Load.....	23	23	Thorndiffe.....
Eglington ton.....	23	23	Garscherr.....
Glenagrock.....	24	24	Sarow.....
Am. Soft, No. 1.....	25	25	Cargoeft.....
Oregon Pig.....	26	26	CHROME IRON ORE.
Pure Sound.....	27	27	Per ton.....
Clay Lane White.....	28	28	LEAD.
Langlois.....	29	29	Pig.....
Thorndiffe.....	30	30	Bar.....
Garscherr.....	31	31	Sheet.....
Sarow.....	32	32	Pipe.....
Cargoeft.....	33	33	(Discount 1/4 on 500 bags.)
CHROME IRON ORE.	34	34	Drop, 3/4 bag.....
Per ton.....	35	35	Buck, 3/4 bag.....
LEAD.	36	36	Chilled, do.....
Pig.....	37	37	Home trade, pr. desk.....
Bar.....	38	38	For export.....
Sheet.....	39	39	
Pipe.....	40	40	

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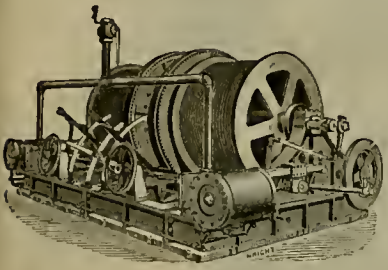
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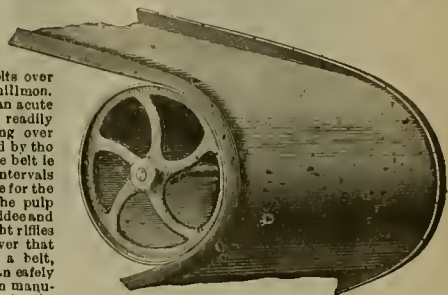
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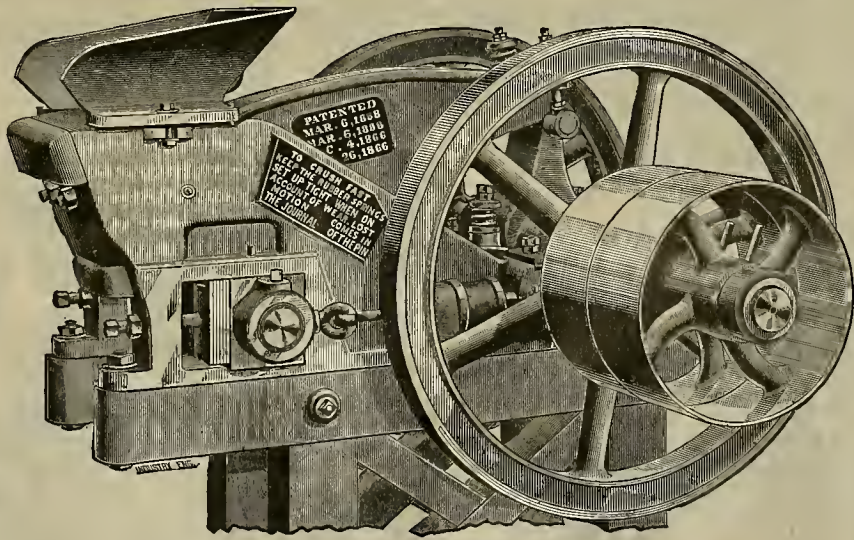
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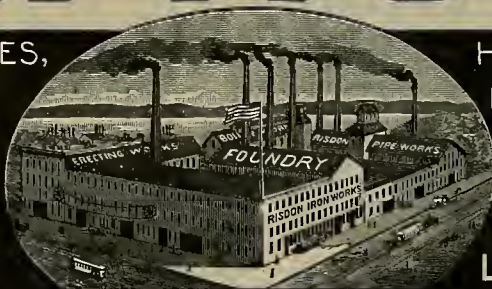
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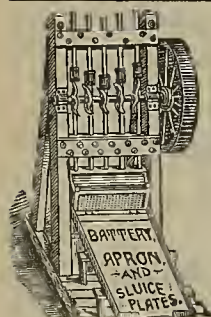
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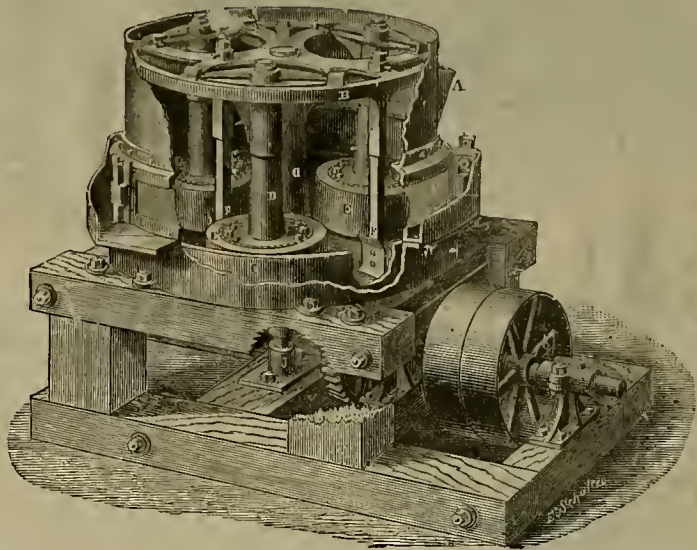
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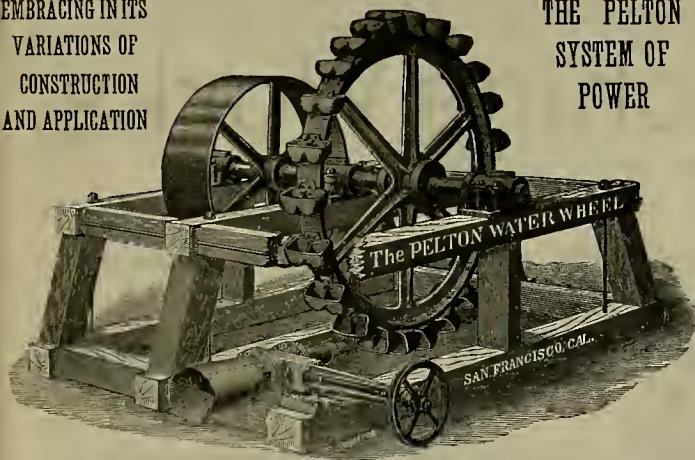
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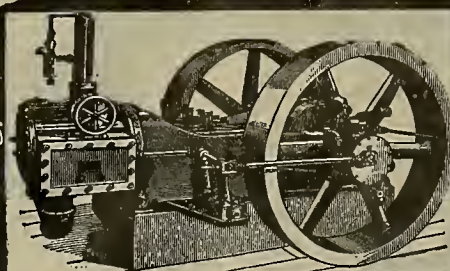
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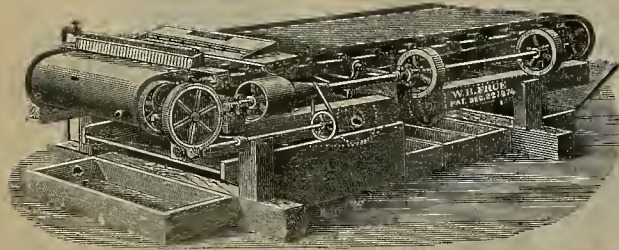
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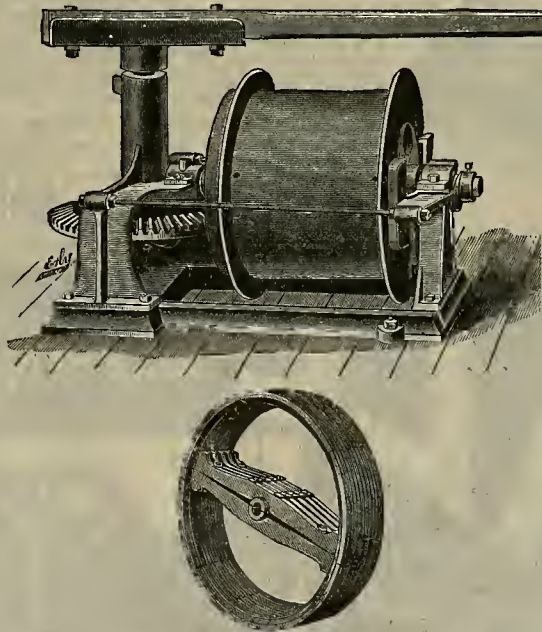
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POSITIVELY FIRE-PROOF.

Can Be Put On
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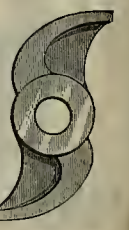
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An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXIV.—Number 23.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JUNE 4, 1892.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

Hydraulic Mining in Trinity County.

In the northwestern part of California, where the rivers are not navigable and do not pass to the ocean through agricultural land, hydraulic mining is carried on without interference of farmers or courts. There is no trouble with the debris in Trinity or Siskiyou counties, as the tributary streams in which the mines lie, drain into the Klamath, a nonnavigable river emptying into the ocean. In the past few years more attention has been paid to gravel mining in these counties, and the region is quite prosperous.

One of the best equipped hydraulic mines in the State is in Trinity county. This is the Red Hill, which is a paying institution regularly every year. The claim has all the best of appliances, an abundant water supply, and gravel enough to work on for many a year to come. They have their own sawmill for lumber, and there are good accommodations in the way of buildings, barns, stables, etc. The mine has long since paid for itself, and it is expected to take out at least \$100,000 this year.

We have reproduced from photographs made by E. H. Benjamin, son of the manager of the mine, a few characteristic features of this claim. One of the nozzles shown is the largest in the State, a 9-inch one. The smaller, 6-inch nozzle, under the pressure of 500 feet, will discharge 1375 miners' inches of water (15,500 gallons) per minute, at a velocity of 175 feet per second. This means about one ton of water each second hurled against the bank with a velocity of two miles a minute. This stream is capable of exciting a force of six tons, and doing an amount of work nearly equal to 2000-horse power. With the 9-inch nozzle proportionately greater results are obtained.

The Hayes Red Hill mine, owned by Dr. A. H. Hayes of Boston, is in Junction City Mining District, Trinity County, at the junction of Trinity river and Canyon creek.

It comprises some 1100 acres of mining land. The bank of the low bar runs from 25 to 150 feet, and on the upper bar from 100 to 200 feet in depth. It was originally opened as a drift mine a number of years ago, but the claim was very rocky indeed, and in 1872 Mr. E. M. Benjamin, the present general manager and superintendent, went up there to bring in the water from the head of Canyon creek. He built a ditch and flume some nine miles long, with a

cables are five inches in diameter, made of 1050 strands of No. 10 Bessemer steel wire. The cables weigh 11 tons each, and had to be made on the ground, because they could not be carried over the mountains. The towers for the cables are made of hewn timbers of sugar pine. The bridge is 34 feet above what is known as high-water mark, and stood the big winter when all the other bridges in the region went out. This bridge alone cost \$36,000.

Even the brief statements made will show that considerable capital must be invested in a fully equipped hydraulic mine to work it properly. The water supply must be abundant, and the reservoirs, ditches, flumes, etc., necessary to bring it to the mine are very expensive.

Hundreds of mines similar to this are lying idle in California to-day, awaiting the action of Congress to permit them again to work without injury to other interests.

This can only be done by building dams to keep the debris back in the canyons and away from the rivers. The miners are willing to build these dams, but unless built with the sanction of Congress, the miners are liable to injunction by any one who may bring suit for injuries inflicted by the debris or tailings.

WORK has been commenced on another electric road in this city—that of the Omnibus Cable Co. The Omnibus Company announces that its horse car line from the Third and Townsend railroad depot along Third, Montgomery, Pacific and Stockton to North Beach will be converted into an electric line. What the company declares to be the beginning of the change was made this week when a gang of about twenty-five men, under Foreman Scott, was put to work.



SCENES ON A TRINITY COUNTY HYDRAULIC MINE.

capacity of 2000 miners' inches. In order to get the pipe onto the claim, it was brought across the Trinity river on a suspension bridge. The largest pipe that comes from the pressure tank down to the bridge is 22 inches in diameter, and runs into an 18-inch pipe. On the claim are six Giants, two of them nine inches in diameter, one of seven, one six, one five, and one four.

At this mine they strip from six to ten acres of bedrock a year. The gold obtained is coarse, cucumber-seed gold. The bridge for bringing the pipe across the river was built under considerable difficulty. It is 350 feet span, with a 12-foot pressure. The

The bed-rock ditch on the high bar is 45 feet deep. The cut is 1344 feet long from the dump to the head of the ditch. The engraving gives a good view of this bed-rock ditch and flume.

The big nine-inch nozzle shown in the engraving is one of the largest size made. The fall is about 500 feet. On the high bar or bench the working pressure of the nozzles is 430 feet. The other nozzle shown in the engraving is a six-inch Hoskin. This and the larger one were made by the Joshua Hendy Works in this city. The flumes are four-foot ones. The mine dumps into the Trinity river, which dumps into the Klamath, and thence to the ocean.

The prospects for the Mining bill continue favorable. Mr. Geary has had a conference with Holman, and the autocrat from Indiana promised to give a definite answer concerning the amount that would be allowed within three days. The resolutions of the Fresno convention have had a good effect.

ELECTRIC ROAD EXTENSION.—Preparations are being made for the extension of the new electric road from Holy Cross Cemetery to Baden, and the iron is already on the ground. This will mean 22 miles built by the company, all that it will construct until the new power-house is built.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—ED.

The Mining Region East of the Sierra.

Some of the Borax Deposits.

SAN FRANCISCO, May 28, 1892.

TO THE EDITOR:—By reason of the State Printer requiring the manuscript of the State Mineralogist to be in hand much earlier than usual, the last report of this official contains less information about the mining districts lying east of the Sierra Nevada than it otherwise would have done, this being especially true of Inyo and Mono counties. While the business of mining has for several years past been greatly depressed throughout these counties, rendering such lack of information the less important, it is still the case that this Trans-Sierra portion of the State abounds with mineral wealth of almost every kind, deposits of gold, silver, lead, copper, salt, soda, borax and iron being very common. What militates most against the progress of this country is costly transportation, coupled with scant supply of wood and water, there being here few running streams and no lumber forests, except such as grow along the easterly slope of the Sierra Nevada, a combination of disadvantages aggravated just now by the prevailing low price of silver.

SALINE VALLEY.

In this valley, which consists of a broad, deep depression lying between the two principal ridges of the Inyo range, is found the only borax deposit of any magnitude in Inyo county. Seen from the summit of the mountain on either hand, this valley presents the most desolate and forbidding appearance imaginable, its entire surface being composed of white and glistening deposits of salt and soda, or barren sage lands, on which there grow nothing but a few wild and bitter shrubs, with here and there a mesquite tree, piñon and juniper growing sparsely on the mountains adjacent. There is here but little grass or other useful herbage, few springs and no running water. The sand driven by the wind, drifts into heaps and cuts like hail. Although the summers are hot, the winters here are not extremely cold. While the rainfall is limited, much snow falls on the higher mountains.

The principal borax deposit in this valley, so far as actual production goes, is owned by Conn & Trudo, who make at the works on this marsh about half a million pounds of the refined article annually. This product is hauled by large teams, across the mountain, 45 miles to Alford on the Carson and Colorado Railroad, over which and connecting roads it is shipped to New York and other eastern markets.

The Stoutenborough Co., having put up here a refinery of limited capacity, lately commenced operating the same, with every prospect of making the enterprise a success, as their superintendent, H. W. Barton, has had much experience at the business and the company's deposit is inexhaustible.

Several other parties own large tracts of the principle saline here, but none of them have as yet utilized much of the crude material, though it is probable that they will in good time do so, as portions of their ground are rich in boracic acid. On the claims of Messrs Cox & Lent the mineral-bearing crust is very heavy, attaining in places, the usual thickness of three and a half feet, a great deal of it being over two feet thick.

Just over the southern boundary of Inyo, in San Bernardino county is situated

THE SEARLES' BORAX MARSH.

One of the most extensive, largely productive, well equipped and ably managed of all the salines found in either California or Nevada, the only countries in which this salt is produced in large quantities on the Western Continent. The deposit here occupies a vast mountain girt basin similar in all respects to Saline Valley.

The Searles' refinery, very complete as well as extensive, is capable of turning out 150 tons of refined borax per month, though, owing to an understanding among the several producers, it is not being run to full capacity. There is employed here, a working force of 40 men, 50 large draft mules being used for hauling the manufactured product to Mojave station, 75 miles distant on the Southern Pacific Railroad. Twenty of these animals constitute a team. Fifteen tons placed on two large wagons coupled together, make a load, and a pretty good one, there being mountains to cross, also long stretches of deep sand. Returning, these teams bring back supplies, including crude petroleum, this being the fuel here used for generating steam. Formerly, sagebrush

and greasewood were employed for this purpose, which practice was kept up until the country for many miles around was completely stripped of these shrubs, making the distance, they required to be hauled, so great, that crude petroleum transported more than 200 miles, 75 on wagons, was found to be the cheaper fuel.

Nowhere throughout the great Mojave desert, of which this region forms a part, do we find any lumber trees except on the Sierra Nevada, which borders it on the west, and in the Kingston range, standing far to the east. On some of the other mountains, not all, however, a sparse growth of scrubby pine and juniper is met with; there being elsewhere scarcely a tree, large or small, to be seen. Along Owen's river and the Mojave, there grew once a narrow fringe of cottonwoods, now all cut away.

Water for the Searles' establishment is brought from a group of springs seven miles off in the Argus mountains, being conveyed through iron pipes and delivered under a pressure of 1000 feet. This water which is pure and soft, is used for feeding the boilers and for domestic purposes, that required for the refinery being obtained by boring on the border of the marsh to a depth of 55 feet. Including the reduction plant, the hoarding and lodging houses, the shops, barns, corrals, etc., quite a village has been built up here in the wilderness. This property, which, everything included, has cost a large sum of money, is now valued at \$1,000,000. It belongs to the San Bernardino Borax Co.; John W. Searles, Manager on the ground, Henry Krehs, Jr., Financial and Commercial Agent in San Francisco.

HOW THE ORE EXTRACTED IS DISPOSED OF.

While mining is so generally depressed throughout Inyo and Mono counties, there is still a considerable population employed at this business. Along the Coso, Inyo and White Mountain ranges, between three and four hundred men are making good wages working their own claims or the claims of others on tribute. These men select from the ores extracted the richer portions, and ship them to markets and smelting works abroad, the balance being left at the mines awaiting the time when it can be profitably treated on the ground. Although there are a good many mills and smelters in that region, only a few of them, owing to the cost of fuel, are running.

Traveling through this country, one comes across a camp here and there that has a good deal of life in it. Such is

FISH SPRINGS.

A not very populous but a really prosperous quartz-mining locality, situated on the west side of Owens River valley, at a point where the Sierra Nevada mountains, receding to the west, leave here a subordinate outlying range traversed by numerous free gold-bearing quartz lodes. Two large creeks, heading in the Sierra, flow across this district, and, having a great fall, afford an almost unlimited water power. Settled here is a small community of miners, who, for working the ore from these ledges, have put up on one of these creeks several large water-driven arrastres. Running without intermission, except for cleaning up, these machines crush a good deal of ore, which yields from six to eight dollars per ton in free gold.

On my visit to this locality, I found there James McCarthy, John Daily, John Welsh and R. T. Dunlop, all men of superior intelligence, courteous to the stranger, and, after the manner of miners, given to a broad hospitality. Besides working their mines, these men cultivate, in this far off and secluded spot, a tract of land, on which they grow and mature every fruit raised in Central California. From what I saw and could learn of these Fish Spring mines, I judge there might be grouped together there a property that would form the basis for a very desirable investment.

MORE LIFE ELSEWHERE OF LATE.

Several other mining camps in this region have shown increased signs of activity during the past year or two; among these, Darwin, Cerro Gordo, Lone Pine, Benton and Bodie being conspicuous. In some of the leading mines at the latter place, the improvement made within the past year has been so marked as to encourage the hope that they will soon be restored to their former condition of large and profitable production. The trouble with these mines has been that, when in bonanza, William M. Lent and the other large owners spent all their revenues in making large dividends, and then selling out their shares at big figures, neglecting, meantime, to keep up advanced explorations. And so it happened, when the ore bodies then being worked were exhausted, the several companies, being without ore or the means for searching after further supplies, ceased taking out bullion,

the most of them until recently having for eight or ten years remained in borrasca. H. DEGROOT.

The MacArthur-Forrest (Cyanide) Process.

CALUMET MILL, MIDDLE CREEK, SHASTA CO., May 25, 1891.

TO THE EDITOR:—At first, after reading the communication of "A Practical Miner" in the PRESS, I thought it useless to reply to so sappy an article, but thinking he echoed the sentiments of some others as to new things, concluded to dot off a few lines, which may be of some general value, not caring for the uncalled-for dashes at me personally. Your correspondent says: "I do most of my scribbling on the rocks, with pick, gad and drill." Taking the lack of good sense in his present communication, I think he had better stick to his tools, until he gets better educated on more modern ways of treating ores. He says: "I, for one, will stand by the good old way—stamps, copper plates, concentrators and the chlorine process." There are others like him, who have got to travel in the same old rut, simply because they cannot see farther than the end of their nose, or think more than to get their regular meals. I well remember when chlorination was first tried in California; it proved a big failure, and laid for several years before a second trial was made; but chlorination succeeded and came to the front. I have no fight against chlorination, it is a good process, but the cyanide is going to override it, from the simple fact that for about half the cost of chlorination, as high a per cent of gold can be had, and, with the gold, a given per cent of silver, which chlorination will not save. Your correspondent further says: "They pretend we lose a whole lot of gold," etc. Yes, I do, and have declared it for at least 30 years, and have written and published within this time some 10,000 pamphlets, of many tests, and the only reward or satisfaction received for all this labor and expense is that my tests are quoted in every important work on gold mining printed in Europe and America, sometimes giving me credit, and sometimes giving others credit, for my work; and further, from the fact that now my position, through the new process, is going to be fully established by the results obtainable.

As to the cyanide process, those opposed to new things may fight, and wear themselves out on it; the process is going to swim above all denunciations. It has come to stay. Your correspondent also says: "I don't take any stock in assays for gold rock." The assayer, chemist and metallurgist have been berated for many years by the "practical miner," but with this new cyanide process, the chemist and assayer steps to the front as the most important man connected with mining, and men of the class of "practical miner," from now on, will be compelled to take a back seat; and the mill-man who is so "practical" as not to accept assays, of properly sampled lots of ore, as its value, will have to step one side for one who does, and not only this, but one who can work up to them. I will say further, the milling plant that cannot work ores up to a high percentage of the assay value (of ores correctly sampled) had better be remodeled for one that can, for this is what you have all got to come to. The sooner this idea is accepted, by the general gold-mining superintendent, the better off he will be, or his occupation will soon be gone.

It should be accepted by all, that a new condition of things, as respects the working of gold ores, is being rapidly inaugurated, and all this rough way of handling has got to be relegated to the past. One talks of low-grade ores; with such an abominable, slashing, wasteful system as the present one, how can ores be other than low grade? Half the ores milled to-day in California should produce one-quarter more metal at about the same expense, and a good portion of the balance one-half more. I know these ideas do not accord with mill superintendents generally; but let them go into a series of experience, in a good, solid way, to get at the facts of the real value of their bodies of ore, and then see how little they get of it. Then they will wake up to the fact that they had not better be left behind in the march of new discoveries.

As to the new process, no one is running his hand in your pocket, taking your coin, and telling you to charge it to the cyanide process. You need not touch it unless you want to, and certainly should not without a trial. In writing these articles, I don't care a fig whether you like the process or not, or touch it or not. I don't own it. It suits me, and the Calumet Co., and the Shasta Co., both of which are working it on a large scale. From this

every day, practical knowledge, I gather a great deal worth knowing. I am simply, in all this writing about it, doing what a man in one sense is a fool to do—trying to benefit others at his own expense.

What gets me, is that men who are interested in mining, should have a desire to jump every new idea, and will seek to ride down those who desire to advance, simply because they have not the least knowledge of the new process themselves.

About the only sensible feature I see in your correspondent's article is his query as to the Mining Bureau. The Mining Bureau is like too many scientific men. They want to wait until the process gets popular, and everybody is posted; then they will talk wisely. I must here make an exception of Mr. C. H. Aaron, who has had the enterprise to start in for investigating, and wisdom enough to not start off like your correspondent, without knowing what he is talking about.

I doubt if this letter does full justice to your correspondent, but it will give clearer heads something to think of at least; and in the light of the multitude, we will bury men of the class of "practical miner." Yours truly, ALMARIN B. PAUL.

A Brief Reply to "Practical Miner."

SAN FRANCISCO, May 28, 1892.

TO THE EDITOR:—When an old man is also an old fogy it is scarcely worth while to parry his feeble efforts to obstruct the march of improvement which leaves him in the rear. The letter of "A Practical Miner" in the PRESS of May 21st, hardly merits a reply, yet contains a few points which should be noticed.

If Mr. Paul has lost money, which I do not know, in the endeavor to advance the mining interest, he is entitled to credit for his courage, and the fact, for it is a fact, that he has "gone back on his homemade idols" in favor of the new process, only proves his freedom from prejudice and self-conceit.

As to the rates at which ore will be paid for in the custom mill, it is not claimed that all ores can be treated at the low cost of \$1.50 per ton, and I think the company takes considerable risk of getting hold of some lots which may give a good deal of trouble in finding out how to treat them, perhaps some which will not yield to the process. The mill will not be dependent on custom work, and I consider the object of doing such work to be, mainly, that mine owners may test the process on their own ores, and learn either what to do, or, which is equally important, what not to do in regard to putting up works.

The miner who may take ore to the mill will not have to wait longer than the time required to crush, sample, and assay his ore. To deny that gold rock, in which the gold is not very coarse, can be sampled, is to talk in a very old-fashioned way, and the process is not intended to treat coarse gold.

The loss of gold in ordinary milling, is too well established to require discussion as a general proposition, to which there may be individual exceptions.

The proposed test of the new process, that it shall enrich the "honest miner," is not a bad one, but how can the test be applied if the said honest miner is too prejudiced to give the process a trial?

It may be a great consolation to the miner to take his horns and see whether they are saving his gold and sulphurets or not? especially if they are not; but the fact is, the spoon may show that there is a loss, but it cannot show that there is not a loss, because the very gold that the new process will surely save, is precisely that which cannot be found by the spoon.

Again, geologists have often assisted miners in recovering a lost vein, and, if "Practical Miner" had acted on the assurances of a certain great geologist, he might have found gold, and made his fortune in Australia before California was thought of as a gold country.

To conclude; all processes that are now old, were once new, and those which are now new will become old. If this process is, as I believe, of real value, it will outlive both Practical Miner and OBSERVER.

The Old Processes.

LOS ANGELES, CAL., May 25, 1892.

TO THE EDITOR:—I notice in reading your valuable paper a number of articles describing or criticising the various new processes of gold extraction, most notably the MacArthur-Forrest cyanide process. I trust that "Pioneer" and "A Practical Miner" will not take it amiss if I suggest that equally able articles from their pens would prove more instructive to your read-

ers in general if descriptive of the "Old Processes," with which they are doubtless more familiar than with the new.

Men who understand thoroughly even the very simple (?) process of gold amalgamation are very few and far between, and letters from such men giving the details of their own practical experience cannot but be of great interest and benefit. I for one would be glad to add to my scrap-book a collection of practical letters on gold amalgamation.

FRANK A. GARBUTT.

A Verdict for the Side Line.

The celebrated mining case of the Calamity mine against the Illinois Mining Company involved the right of the defendant company to enter upon and extract ore from the ground of the Calamity mine, upon the theory that said company followed a contact vein across the side line between the two claims, the apex of which vein was upon the surface of the Illinois mine.

These mines are situated at Kingston, in Sierra county, and the Illinois Company claiming the possession of such a vein as they had a right to follow upon its dip beneath the surface of the Calamity mine, across the side line, did enter upon and extract a large amount of ore therefrom. The owners of the latter mine brought a suit in ejectment and for damages in the sum of \$60,000.

The case was brought to this county upon a change of venue, says the *Southwest Sentinel* (N. M.), and a trial at a former term of the District Court here, about a year ago, resulted in a hung jury, it being generally understood that the jury stood eleven to one in favor of the Calamity mine in that trial. After one of the most stubbornly contested legal battles ever fought in the courts in this county, occupying ten day's time, the jury reached a verdict for the plaintiff, which carries with it possession of the ore within the side lines of the Calamity mine, debarring the Illinois Company from entering upon the same. Nominal damages in the sum of \$1 were awarded plaintiffs and the costs against the defendant company.

The special findings of the jury in answer to questions of fact propounded by the parties to the suit and submitted to the jury by the judge were:

That there is no vein in the Illinois mine; that there is a contact of lime and shale in the Illinois mine, and that the contact extends through the Calamity, Brush Heap and Andy Johnson mines; that the Brush Heap and Andy Johnson were prior locations to the Illinois; that a lime bed or deposit underlies the shale, and that the ore in the Illinois is found in the lime, and that the footwall has not been ascertained to be well defined.

The defendants asked to have the verdict set aside on the ground that the special findings were inconsistent with the general verdict.

After argument, the court overruled the motion and sustained the verdict of the jury, holding that there was no inconsistency, the special finding regarding the contact in no way conflicting with that of no vein in the Illinois mine.

This was followed by a motion of the defendant company for a "venire de novo" and for a new trial, which, being overruled, notice of an appeal was given.

The attorneys for the plaintiffs were H. B. Ferguson, of Albuquerque, and Fielder Bros. & Heflin, of this city; and Neill B. Field and B. S. Rodey of Albuquerque, and Bell & Wright, of this city, were the defendants' attorneys.

Brilliantly, learning, logic, reasoning and oratory were all displayed by this array of legal talent, and seldom have a Grant county jury been so well entertained and instructed by the legal fraternity as in this case.

Judge McFie's charge was eminently fair and impartial, and will take rank as an able contribution to legal mining literature.

In all the mining camps of this section the irregular deposits and channels of ore in limestone, over which (limestone) there is a shale contact, have not been regarded as veins in the meaning of the law, and in Kingston, Georgetown, Chloride Flat, San Pedro and other places the side lines of claims have been accepted as limiting the extent of the right to extract ore by any claimant. The miners in these camps will be pleased that a Grant county jury has not decided to the contrary.

AS AN evidence of the fact that the present investigations and experiments of electricians are in the right direction, the firefly furnishes direct proof that light may be produced without the accompaniment of heat.

Prizes for Single and Double Handed Drilling.

The National Mining Congress will be held in Helena, July 12, 13 and 14, 1892. Those in charge of the affair at the capital city are working hard to make it a decided success, which it will undoubtedly be. Especially so is this the case in the rock-drilling tournament. Following will be found the rules and regulations, with a list of the principal prizes:

The drill committee of the Montana executive committee National Mining Congress, respectfully announces a three days' tournament of rock-drilling contests during the second session of the National Mining Congress in Helena, Montana, July 12, 13 and 14 next, and offer the following prizes in connection therewith:

FOR DOUBLE-HANDED DRILLING.

First Prize	\$700
Second "	400
Third "	300
Fourth "	250

FOR SINGLE-HANDED DRILLING.

First Prize	\$350
Second "	200
Third "	150
Fourth "	100

The entrance fee for double-handed contest will be \$25 each team, and \$12.50 for each individual entering the single-handed contest.

This committee will appoint three judges, whose duty shall be to take entire charge of the drilling exercises, looking to the selection and placing of granite of uniform character, marking thereon the places where each team or man shall drill; to start and stop the men; measure the depth of the drill holes, and at the close of the tournament to award the prizes, giving to the team and man drilling the deepest and best hole, in their respective contests, the first prizes; to the team and man drilling the next deepest and best hole, in their respective contests, the second prizes, and so on, giving certificates upon which to draw the amounts won. The decision of these judges shall be final.

Each county in any mining State of the United States shall be entitled to send three teams to the contest, also three single-handed men. In the event more than that number for one county desire to compete, it shall be determined by mutual agreement or home contests, which shall be admitted.

All entries must be made at least five days prior to the first day of the tournament. In case of inability of any of the contestants to be present during the tournament, others from the same county may be substituted, at the discretion of this committee.

All drills used by the double-handed teams shall be of seven-eighths steel, and the hammer shall not exceed eight pounds in weight.

All drills used by the single-handed men shall be five-eighths steel, and the hammer shall not exceed four pounds in weight.

Each team or man must furnish their own drills and hammers.

All holes shall be down holes, and in granite blocks, uniform in character, to be provided by this committee.

The time of drilling shall be limited to 15 minutes, and two teams and two single men shall work at a time.

In case of tie, the winner shall be decided by again drilling, as may be decided by the judges.

Any contestant who shall violate any of the rules, or refuse to obey any instructions of judges, shall forfeit all right to contest or to receive any prize.

These rules are subject to change by the drilling committee.

The tournament will embrace contests of three (or more, if necessary,) successive nights, commencing July 12, 1892, at 8 o'clock each night, and will be held in the new Helena Auditorium, which has a seating capacity of over 2000.

Parties desirous of offering special prizes are requested to notify this committee through B. Brown, the secretary, Helena, Montana.

REFRIGERATING MACHINES.—Prof. J. E. Denton and D. S. Jacobus of Hoboken, N. J., at the meeting of the American Society of Mechanical Engineers in this city, presented a summary of results of principal experimental measurements of performance of refrigerating machines. The paper deals with tests of air machines, ammonia machines of both the absorption and compression type, sulphur-dioxide or Pictet machines and carbonic acid machines. The refrigerating effect of the first is equivalent to 3.4 pounds of "ice-melting effect" per pound of coal required to drive the steam engine, or 43.1 per cent of the theoretical result. In the second, the "ice-melting effect" per pound of coal is 20.1 pounds, which is 52.2 per cent of the theoretical effect. In the third, or compression type of ammonia ma-

chine, the "ice-melting effect" varies from 46.29 to 16.14, according as the suction pressure varies from 45 to 8 pounds above the atmosphere, this pressure being the condition which mainly controls the economy of compression machines. These results are equivalent to realizing from 72 to 50 per cent of the theoretically perfect performance. The Pictet machines are practically as economical as the ammonia. The carbonic acid machines have an efficiency considerably less than the ammonia, and as they require pressure reaching 800 pounds per square inch, there seems to be no reasonable ground for their use.

Hard Work for Nuggets.

The Nevada *Transcript* published an item about M. F. Skeahan bringing to town about \$200 worth of gold nuggets, varying in size from \$25 to five cents. From Mr. Skeahan the *Transcript* obtains the following particulars of where and how he obtained the nuggets, and other interesting notes about his mine. The mine from which the nuggets came is situated on Democrat Hill, near Lowell Hill, Little York township, and is known as the Democrat gravel mine. The property embraces 160 acres of patented ground, and is owned by Mr. Skeahan and Richard Neville of French Corral. The channel is known as the old Remington Hill channel, and passes through the whole ground owned by the above named gentlemen. A tunnel has been run in the mine a distance of over seven hundred feet. At the end of this tunnel an incline shaft has been sunk a little over two hundred feet, and at the bottom of this shaft is where the gold nuggets were taken out. In order to get the nuggets and coarse gold, Mr. Skeahan, who is working alone in the mine, is compelled to handle the gravel six different times before he gets any gold from it. He has a hard as well as well as a very novel way of getting the gravel to the washing dump. First—He shovels the gravel out of the channel and throws it up on a platform four feet high. When he has a car-load or more on the platform he goes up to platform No. 1. Second—He then throws the gravel from there up on platform No. 2. Third—From this to platform No. 3. Fourth—He then takes the gravel up again and dumps it into a wheelbarrow, and fifthly, wheels it up the incline shaft about one-hundred and eighty-five feet to the tunnel. Sixth—He then shovels the gravel into a car, and runs it seven hundred feet to the sluice where it is washed. He has been making two and three trips of this kind a day, off and on, for the past six or seven weeks, and by so doing, he says, "I have made first-class wages, even if I did work at considerable disadvantage." The Remington Hill channel is known to be five thousand feet long and twelve hundred feet wide, and is unquestionably one of the richest channels in the State.

Mr. Skeahan says the ground prospects from three or four colors to the pan up to fifteen or sixteen—from the grass roots down to the bottom of his incline shaft. He says that if he was permitted to hydraulic for a few months he could take out more money than he would know what to do with.

Disposing of the Sewage.

The Polyclinic lecture on the Sewage and Sewerage system of San Francisco, delivered by Dr. I. H. Stallard, has been printed in pamphlet form. No more vital question than this could occupy the attention of the medical faculty nor yet of the general public, which latter should feel under deep obligation when one so competent devotes his time to the investigation of a matter of such moment to every resident of the city. Dr. Stallard, who is not only a statistician, but an original investigator, has shown great industry and intelligence in his treatment of this subject, wherefore his recommendations and opinions are entitled to be carefully considered by our municipal authorities when legislating on these sanitary questions, and that, notwithstanding these opinions may, on some points, conflict with those heretofore entertained by our city engineers and our city fathers. It has generally been supposed that a few large sewers would answer a better purpose than a larger number of small ones—an idea that Dr. Stallard proves to be erroneous—this very high authority exploding also divers other popular errors.

The substance of this pamphlet ought to have wide circulation—a mission which the daily press ought to feel itself appointed to perform. Copies could, we presume, be obtained from Dr. Stallard, Sutter street, also from the Board of Health.

Varieties of Silver Ore.

"How many different kinds of silver ore are there?" said the Tenderfoot to the Old Timer as they stood in front of a Main street saloon, looking at some black sulphurets a prospector had just brought in from some other man's dump and was trying to claim it for the product of ore of his own wild cats.

"Well, to tell you the truth, I don't know. Suppose we go and look them up from Webster. Although he does not give them all, we will see how many we can find, and guess at the rest." So they meandered off down to the printing office and got Webster's Unabridged, and this is what they find:

"Silver, a soft, white, metallic element, very malleable and ductile, and capable of a high polish. It occurs pure in nature, and also in combination with sulphur, arsenic, etc., and with ores of lead, copper and gold. "Black silver, a massive, compact, sectile mineral of an iron black color, consisting of silver, antimony and sulphur, and valuable as an ore; also called brittle silver ore or brittle silver glance.

"Gray silver, an ore of a light steel gray, silver white, also blackish lead gray color, consisting of silver, lead, antimony and sulphur; antimonial sulphurets of silver.

"Native silver, a mineral of a silver white color and metallic luster, occurring usually in filiform, reticulated, arborescent forms, and consisting of silver, with some copper, gold, platinum, antimony and other metals. It is sometimes found in large masses.

"Ruby, or red silver, an ore of silver of a ruby-red or reddish-black color. There are two species: The dark red contains 59 per cent of silver united to sulphur and antimony, and the light red contains 65 per cent combined with sulphur and arsenic.

"Silver glance, a mineral of a blackish lead gray color and metallic luster, consisting of sulphurets of silver; also called vitreous silver.

"Aerosite, a dark red silver ore, argentiferous mercury, the native amalgam of silver.

"Argentiferous, containing or affording silver; specifically containing silver as an incidental ingredient."

These are some of the ores of silver. The names of several other kinds of silver ores are merely combinations of name. For instance, carbonate of silver is a combination of silver and carbonic acid. Bromide of silver is a combination of bromic acid and silver. Chloride of silver is a combination of chlorine and silver. Sulphurets of silver is a combination of sulphur and silver, and these combinations differ in color. Bromide of silver is a dark velvety green, a glossy indigo. Chloride of silver is a yellowish waxy color, like a clear horn, and is usually called horn silver. Horn silver is the native chloride of silver. Sulphurets of silver is black and glossy, looks like coal soot, and all of them will receive a high polish.—Old Timer in Belt Mountain Mine.

THE growth of the ocean steam marine causes a scarcity of naval engineers. Chief Engineer Melville argues that the modern naval engine is a wonderfully complex apparatus, every part of which must be constantly watched, and that, where engineer officers do not have enough assistance, they are under a constant nervous strain for fear of accidents. Secretary Tracy also says that it is "false economy to put in our new vessels all that is most advanced in high-pressure machinery and then to provide an insufficient number of officers."

MAHOGANY varies in price according to a great variety of things. Some fetches as little as ten cents per square foot, while some is as high as 50 cents per square foot. Little of the wood brings more than this, though now and then unusually fine mahogany sells at 70 cents per square foot. A cargo of 300,000 square feet in squared logs may be worth \$50,000. The best walnut, now unpopular, fetches more than any but the finest mahogany.

AUSTIN MINES.—The *Central Nevadan* says the Yankee Blade mines near Austin are producing some fine silver ore, specimens of which run as high as \$10,000 per ton. There are strong probabilities of the Austin Mining Co. commencing vigorous work on the big tunnel at Clifton, which is to be three-quarters of a mile long, operated by hurelgh drills, lit by electric lights, and which will crosscut the numerous ledges of Lander Hill.

AN English firm has invented an ingenious device for turning on the currents for electric lamps at a certain hour. An ordinary clock is so adjusted that at the desired moment a spring is released, permitting a pair of pivoted contacts to fall into mercury cups, thus completing the circuit.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger: The water is being slowly lowered in the Hector mine. They are nearing the 300-foot level, and the condition of the shaft so far is found to be good. The only trouble encountered yet is with the track, which needs the closest attention. Owing to the lapse of so many years, the iron on the track has almost completely rusted out, causing a good deal of inconvenience and trouble. False tracks are used, and the water level is steadily descending. A valuable improvement is being made at the Wildman mine, in the shape of a track from the mouth of the shaft to the blacksmith shop, a distance of 60 feet. The track will be provided with a small car, the object being to facilitate the taking of tools to and from the blacksmith shop. Some of the tools, especially the Burleigh drills, are weighty and involve much hard work in packing to the shop for sharpening. The improvement involves little expense, but is quite important as a labor-saving device.

GOLD MOUNTAIN.—Amador Ledger, May 28: Last Wednesday we visited the important mining enterprise now being prosecuted by the Gold Mountain Company at Quartz Mountain, and which, under the able management of W. B. Farwell, the superintendent, is proving a financial success, and that, too, in face of several failures to work the mine profitably. The prevailing impression is that Quartz Mountain, as its name implies, is simply a mountain of quartz without any defined walls or other characteristics of a regular ledge formation; that the existence of this gold-bearing deposit was a freak of nature, unexplainable upon any scientific theory; that the quartz existed merely as a crust, covering a considerable portion of the crest and sides of the mountain. A visit to the scene has effectually dispelled this notion. The vein here differs little from other quartz ledges in the county—that is, as far as any peculiarities in its formation are concerned. The quartz deposit was evidently formed before the mountain, and in the convulsion which created the mountain the quartz was partly thrown from its native position and laid upon the surface, forming a cap on the crest and side of the hill, so that while considerable of the surface croppings consist of a layer of quartz of varying thickness, below this a well defined ledge is encountered, with foot and hanging walls distinctly marked. The top rock, owing to this displacement, lies almost horizontally, and as far as the ore body has been explored, it has less pitch than quartz veins in this county usually have; also, the course of the vein, instead of being almost due north and south, is northeasterly. It is probable, however, that these departures from the general rule are due to the superficial displacement, and that as depth is reached the vein will take its true course and regular dip. Three tunnels have been run into ore, the lowest tapping the ledge 150 feet from the surface. Here the vein is from 10 to 12 feet wide, and richer than above. Nearly all the rock carries gold in paying quantities. Very little is thrown away as waste, which is remarkable considering the vast quantity forming the cap. Some of the ore yields as high as \$10 to \$15 per ton; the average is between \$4 and \$5, which yields a handsome profit on account of being so situated for economical working. The 20-stamp mill is about half a mile from the mine, and two teams are now employed in hauling ore. This method of supplying the mill will soon be dispensed with. A car track is being laid connecting the two, and this will be completed and in running order inside of a week. A large ore bin has been built at the end of this track, and this will be connected with all the drifts supplying ore for the mill.

MISCELLANEOUS.—At the South Eureka, prospect drifts have been started east and west. John Bowden is in charge of the Amador Queen mill. We are informed that the last cleanup, from a run of two weeks, yielded at the rate of \$15 per ton. A gentleman from San Francisco was here last week looking at the Bright mine, near Jackson. He was much pleased with the property, and will endeavor to get capitalists to take hold of it. This is one of the best prospects to be found on the mother lode.

Kern.

A NEW MINING ENTERPRISE.—Bakersfield Californian, May 28: Jos. Weringer, L. Gubm and J. H. Mayfield have commenced to open the Jackson mine, on White river. The mine is in slate and carries an 18-inch vein of quartz, which yields from \$12 to \$22 per ton in gold. It is easily worked, being mostly picking ground. Thirty feet from the surface a level is being run into the hill, thus gaining depth with its progress. The Woody mine, opposite the Jackson, in the same formation and of like characteristics and quality, is also being worked by the same parties. For milling the quartz, a water power arrastre is used, being so located that 200 inches of water, with 20 feet fall, supplies the motive force.

Modoc.

THE LATE MINING DISCOVERIES.—Alturas Herald, May 28: The mining excitement at Willow Ranch still continues, and well it might, for, after a personal investigation, we satisfied ourselves that the discoverers of the claims have a good thing. Last Friday we left Alturas and drove direct to Willow Ranch. The first location we came to was that of J. A. Barnes and James Burns, and is situated about a mile and a half north from Willow

Ranch. This was the first claim discovered, and Mr. Burns has the credit of being the discoverer. They prospected the ledge in various places on the side of the mountain, and found that the ore was free-milling and carried gold, and this spring commenced driving a tunnel in from the base of the mountain, and expect to tap the ledge at a distance of a hundred feet. These gentlemen are working their claim in systematic style, and when they come to the ledge and find that the ore prospects as good as it does on the surface, they will own a piece of property that will be worth money. The Robinson & Cowan claim is situated about a hundred yards north of Burns' mine, and there is a vein of ore in sight 24 feet wide. The foot-wall is granite and the hanging wall is porphyry. The indications are that the ledge will become wider and the ore richer as depth is attained. These parties have opened the ledge on the side of the mountain, for a distance of 30 feet; at a depth of from one to ten feet. We extracted some of the ore, and, after crushing it in a mortar, panned it down, and there was gold and plenty of it. Even the dirt taken out of the vein carries gold. An arrastre is being put up by Mr. J. A. Barnes, and other parties owning claims in that vicinity will follow suit. This body of ore crops out in various places from Davis Creek to Lakeview, Or. The parties who have located claims beyond Robinson's mine are A. B. Layson, W. M. Mills, L. B. Moss, Morris Dick, L. Selts and other. Dave Jones, of Lakeview, is interested in the Mills' claim, and will put a force of men to work this week. The hills are lined with men prospecting, and it would not surprise us if new and richer finds are found in that neighborhood in the near future. Deep snow on the ranges back of where the ledges were discovered have hindered the ranchers from prospecting them, but just as soon as they become bare, hundreds of men will be searching that portion of the district for the precious metal. There is an abundance of wood and several large streams of water in close proximity of the mines which could be used to run the mills. Taking everything into consideration, we believe that Modoc county will soon produce a vast amount of bullion.

Mono.

THE MONO.—Bodie Miner, May 28: During the past week, north drift No. 2, 600 foot level, was extended 22 feet. Upraise No. 1, north drift, same level, was extended 13 feet. There are about five inches of quartz in fact that give fair assays. West crosscut, same level, was extended 14 feet. We stopped crushing ore on the 20th inst. We will put in new pans and settlers before starting the mill again. Average battery samples, \$40.93; average tailings samples, \$6.45. There were employed five miners, one carman, and, jointly with Bodie, one engineer, one blacksmith, one carpenter, one fireman, one watchman, one laborer and one foreman. Employed at the mill, two engineers, two battery men, two panmen, two tankmen, one laborer, one foreman.

THE BODIE CON.—During the past week, east crosscut No. 1, 700-foot level, was extended eight feet. East crosscut No. 1, 550-foot level, was extended seven feet. North drift from above crosscut was extended 11 feet. In the face there are about four inches of quartz that prospects well. South drift from above crosscut was extended ten feet. Upraise, 400-foot level, was extended four feet.

Nevada.

RIVER MINING.—Grass Valley Union, May 26: Several of the companies that worked in the bed of the South Yuba river last season will resume operations this season, feeling confident that the work done there has shown just where pay dirt will be found. One of these companies will be composed principally of residents of Grass Valley. One of the Chinese companies that worked on the river last year, and went to considerable expense, took out enough gold to pay all expenses and divide \$200 each to the 13 members constituting the company, and yet they were unable to get down to bedrock. It is known that there are places in the river that were never worked in the early days, and confidence is felt that there is much good ground yet left that will pay well for being worked.

GOOD LEOGE STRUCK.—Grass Valley Telegraph, May 26: A few days since we made mention that the Oak Tree had started its machinery to work and that they had started their miners on the course to delvay down in the bowels of the earth. The miners commenced the labors of fixing up the old shaft and last night they found a shaft about six inches in width, and ore from it shows free gold in a most encouraging quantity. The ledge was hardly expected to be encountered at the present depth, and is thereby a gratification to the owners. The rock can be seen at Granger & Watt's store.

OMAHA DIVIDEND.—The Omaha mining company of this place declared dividend No. 7, and it was payable on the 24th (yesterday). The dividend was of the amount of 15 cents per share. There is no material change in the mine as far as quality of ore is concerned. The mine is looking well in whatever level Mr. Mainhart is causing it to be worked and the regular dividend is an assured thing for many years yet.

CHAMPION IMPROVEMENTS.—Nevada City Herald, May 28: Things have a busy, bustling look down at the Champion. The new mortars are in, the mill is pounding away once more, and the 60 men employed there are again on shift. Grading is going on for the ten new stamps, which are to be added to the 15 now in use. The addition will be put on the west side of the present battery. Two tracks have been laid, and a line of ore cars is used in the grading. A new concentrator is being put in—a six-foot Frue vanner, the largest in the county. Lawns do not seem to worry the Champion Company. They go right on with their improve-

ments, spend thousands of dollars and employ more men than any mine in this district.

A MINE SOLD.—Stewart & Donohue have sold the Maryland ledge to J. L. Postelwal and Joseph Floyd, of this city. The Maryland is located on the South Yuba river, about three miles above Washington. It is a good mine, and is pretty well developed now. The ledge is four feet thick where it is now exposed, and there are 1500 feet of backs. The rock shows well in free gold, and averages \$50 per ton. We were shown some this morning which will run much higher than that. The mine is worked by a tunnel, two shifts being now at work. Three shifts will be put on next week. The gold from this ledge is worth \$18 per ounce.

San Bernardino.

THE MACEDONIA.—Redlands Graph, May 22: Mr. Farnsworth of Victor, Dr. Pritchard and Mr. House of Los Angeles and Mr. Nowlin of Riverside have bonded the mine known years ago as the Macedonia. It is situated in what was once known as the New York mining district, but which is now a part of the Palm mining district. It is about 40 miles west of the Colorado river and 26 miles north of the Santa Fe railroad. The property is also within 20 miles of Green Campbell's mines, which are said to be producing steadily. The above-named gentlemen are very hopeful of good results, as the last ore taken out ran \$900 to the ton. The property was worked 20 years ago by the well-known 'Lige Moulton and partners. At that time the Indians were much more numerous and troublesome, and some of the men interested in the mine were killed and the others were driven away. In this way it became lost and remained unworked until a comparatively recent date. There is also said to be paying gold ore in that region, and that a lot of it, after a long haul on wagons across the desert, was sent to San Francisco, and paid \$300 per ton above all expenses. The old New York district was rich in low-grade ores, and a railroad through that section would set thousands of men at work. Should the railroad from Utah come down the proposed route, we predict the starting up of a dozen prosperous mining camps along its line from Utah to a connection with the crossing of the Atlantic & Pacific railroad. That country is a treasure house of the useful and precious metals.

Shasta.

A BIG MINING SALE.—Democrat, May 26: For some months past, quiet negotiations have been going on for the sale and purchase of the Morton and Bliss mining property on Squaw creek. This group of mines is a portion of the locations originally made by Jack Conant and subsequently sold to Riley, Bliss and Morton. Conant, it will be remembered, was the discoverer of the mines in this camp and located 12 or 14 claims, about half of which he sold to Riley shortly after he located them, and with the money derived from this sale developed the Uncle Sam mine, the principal claim in the group he reserved. Later on he sold the Uncle Sam group to the Sierra Butte Mining Co. for \$150,000. Mr. James, the superintendent, negotiating the purchase. The mines sold to Riley, Bliss and Morton are known as the Riley group. Mr. Riley subsequently disposed of his interest to Morton and Bliss of New York, and now Sig. Weil and Barney Conroy of this city have purchased the property from Morton and Bliss. The purchase price is \$150,000, payments to be made in convenient installments. The new proprietors will take possession of the property to-day, and will immediately start up the ten-stamp and two Huntington mills, and put a large force of men in the mine. The purchase includes some other mining property in other mining districts, and all the improvements, mills, tools and other personal property attached to the mines. Ed Hume, who has been foreman for the Hart mine in Old Diggins district, will take charge as superintendent for Weil and Conroy. We are pleased to know that this big mining property has passed into the hands of Shasta county men and residents of Redding. Mr. Morton, one of the former owners, is Vice-President of the United States, and Mr. Bliss' name is familiar in every mining camp throughout the United States and Mexico.

MINING ITEMS.—M. D. Butler and son Frank, of the Altoona quicksilver mines, recently purchased the old Delta mine on Dog creek, about six miles west of Delta. Last week they went to work to prospect the mine by starting a new drift westward from the lower tunnel. The first shot put in exposed a rich body of free gold ore, considerable of which is specimen rock. How extensive this body of ore is, remains to be seen. The tunnel was driven past this rich vein several years ago by S. M. Whitlow and Ed Sanders, the former owners of the mine, but it was not their luck to discover it. Gerald O'Shea of Trinity Center reports to us that some very rich placer diggings were discovered early this spring on Swift creek, near Trinity Center. The discoverers of the ground have already taken out considerable dust. Considerable of it is heavy and coarse. A chunk worth \$150 was picked up in one of the claims. We hear that the Walker Bros. are putting up a 20-ton plant of the MacArthur-Forrest cyanide process on their mine on Star gulch, Old Diggins district. Shasta county miners are beginning to believe that this new process is specially adapted for working the refractory gold ores in this county. This will make the second plant of that kind in the county—both in Old Diggins district. Oliver Sunderhaus, of the Young America Mining Co., who mined on Squaw creek three years ago, was a visitor in town yesterday. He has been up in the Klamath river country and Southern Oregon looking after mining property, and expects to do some prospecting on the Klamath river this summer. The South Fork Milling Co.'s plant is nearly completed. The roller

crusher shipped from Denver some time ago is yet on the road, but is expected to arrive at Anderson any day. When that is put in place, the plant will start up. The new owners of the Hidden Treasure mine are preparing to put up a stamp mill on the mine, and will have it in operation as soon as possible.

Siskiyou.

GRAVEL.—Yreka Journal, May 25: We learn that Senator R. H. Campbell has made another rich strike in his hydraulic mine at Quartz Valley, the bedrock being covered with a great abundance of coarse gold at last point where his hydraulic elevator reached it. He has been making tests all over the claim under instructions from the English company to whom the ground is bonded, and every test proves the entire extent to be rich at and near the bedrock. Mr. Campbell will start halow again in a few days to confer with the agents of the English company, now ready to proceed in working the claim on an extensive scale. The delay of the company in taking charge as soon as expected has been caused by the death of a prominent member of the company, whose place has been filled by other parties filling his place in providing the means necessary to complete the syndicate capital. The Phil Mott claim at Klamath river has been paying exceedingly rich this spring, the cleanpp from the last cut yielding over \$2000. The derrick has just been moved for the purpose of sinking down a new cut. The China claim, near the Mott claim, is also paying handsomely, and the owners want to put on night shifts, but have been unable to secure hands. They sent agents to Ashland, Jacksonville, Sisson and other places for Chinamen without being succesful, hence will not be able to work the mine to as good advantage as they would like. The Centennial claim, just below Honolulu, on the Klamath, is now being opened by 27 young Oregonians, it being impossible to secure hands in this county, and the superintendent, W. N. Gott, expects to take out considerable gold dust during the river mining season. He has been delayed somewhat in starting operations, owing to the difficulty in securing hands. All the other river claims are being fixed up for successful work, and the owners are also troubled considerably in the matter of securing sufficient help. Down at Oak Bar, on the Klamath, the river miners are busily engaged in constructing wingdams for the purpose of getting down to the bottom of the channel, where gold dust is plentiful in the crevices of the bedrock, and in the gravel for several feet above. At Buckeye Bar, in the same vicinity, the work of dam-building is progressing steadily, although hands are scarce and hard to get, owing to so many Chinamen leaving to make room for industrious white labor. James Ironsides, who has some rich quartz mining property on Cherry creek, about nine miles south of Yreka, says the prospects in his Cherry Creek mine look fine, and that as soon as he completes an amount of dead work necessary to open the ledge in good shape, will take out rich ore in great abundance. His ledge extends through the mountain at the Deadwood divide between Cherry creek and Greenhorn, and is of good average size and richness to pay handsomely. He has other rich ledges in the same vicinity, which he intends to develop later, when his Cherry Creek mine is opened for successful working. Gena Dowling has been finding some fine prospects in his quartz ledge at Cherry creek, lately, and secured \$71 in almost solid specimens last week. The ledge contains many rich spots, where the gold is very thick, and almost free from any other substance.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Chronicle, May 28: 1100 level.—From the end of the drift running south from the top of the upraise 73 feet above the sill floor, which was carried up from the mouth of the west crosscut No. 3 from the main south drift 310 feet south from the shaft station, the west crosscut has been extended 28 feet; total length, 154 feet; continuing in vein porphyry, with fine lines of quartz of low assay value. 1500 level.—From the south drift at point of connection with the old stopes we continue to extract some ore and fillings of average milling value. From the upraise which was carried up from the end of the crosscut run west 36 feet in from the main south drift, 155 feet south from the shaft station, we have continued to work upward and to extract ore of fair quality. 1600 level.—We have continued prospecting upward from the old sill floor of the old stopes, from which some ore of fair quality is being extracted. The ore streak on the east side of the old stope timbers has become narrower and of purer quality. 1650 level.—Have continued prospecting west from the upraise, 35 feet above the sill floor, which was carried up 59 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from the winze No. 3 (down 73 feet) in working upward from that point. From the north end of the California ground on the west side are working in the old stopes and extracting therefrom some ore of fair quality. From the bottom of the winza sunk 28 feet in this locality through the old timbers, on the east side of the northwest drift, a south drift has been advanced in a porphyry and quartz formation of low assay value. 1750 level.—In east crosscuts No. 1 and No. 3 from the main south drift, in working upward from the sill floor, have continued to extract some milling ore. 1800 level.—Along the south end of the drift running south from the crosscut run east from the winze No. 1 sunk from the 1750 level, we have continued to extract some ore from the sill floor upward of milling value. The winze No. 2, started in the drift run north from this same east crosscut, has been sunk 15 feet; total depth, 30 feet; continuing in a quartz

formation carrying low assay value. There have been extracted from all parts of the mine during the week 1078 780-2000 tons of ore, which was shipped to the Morgan mill, the average value of which, per car samples, was \$29.07 per ton. The average assay value of all the ore worked at that mill during the week, 980 tons, was \$22.96 per ton, per battery samples. Bullion shipped to the Carson Mint, assay value, \$31.101.04.

OPHIA.—1465 level.—The largest portion of the week having been spent in laying air pipe for the purpose of ventilating and drilling, work was then resumed in the drift running south 101 feet below the sill floor of the 1465 level, from the Mexican into the Ophir ground, and ten tons of ore were extracted therefrom and raised to the surface, the average assay value of which was \$19.95 per ton. The face of the drift is in porphyry and quartz, carrying an assay value of \$19.50 per ton.

MEXICAN.—On the 1465 level the drift running north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level near the south boundary of the mine, at a point 40 feet east from the winze, has been advanced 19 feet; total length, 30 feet; continuing in a porphyry formation, showing fine lines of quartz.

UTAH.—340 level.—From the west crosscut, 340 level, at a point 595 feet from the shaft, the north drift has been extended 56 feet; total length, 226 feet. This drift is showing more quartz of low assay value, mixed through the porphyry formation.

SIERRA NEVADA.—West crosscut No. 1 from the north drift of the Kenosha tunnel, 1000 feet in, has been advanced 40 feet; total distance, 95 feet; face in porphyry. The joint Sierra Nevada and Union west drift, 900 level, was extended during the week 30 feet, making its total distance west of shaft 2024 feet; face in porphyry and streaks of quartz.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, has been advanced during the week 30 feet; total distance west of shaft, 2024 feet; face in porphyry and streaks of quartz.

ANDES.—On 420 level north drift from west crosscut No. 2 extended during the week 26 feet, continuing in quartz.

BEST & BELCHER.—900 level.—East crosscut No. 1 has been advanced 17 feet; total, 176 feet; face in hard porphyry and seams of clay. West crosscut No. 1 has been extended 20 feet; face in hard porphyry and quartz.

GOULD & CURRY.—200 level.—Northwest drift, 435 feet west of shaft, has been extended 21 feet through porphyry and bunches of quartz; total length, 312 feet. 400 level.—East crosscut No. 1, from northwest drift, has been extended 20 feet through soft porphyry and quartz; total length, 62 feet.

HALE & NORCROSS.—On the 800 level are making some necessary repairs to the west drift, 900 level.—We are extracting ore from above this level and repairing main drift. Hoisted from this level during the week 233 cars of ore. 1000 level.—South drift from bottom of 900 north winze, started last week, has been advanced 15 feet. Face shows some fair grade ore. We have laid a track and timbered this drift as same advanced. This level furnished 15 cars of ore during the week. 1100 level.—From our north and south stopes above this level we are stopping out ore. There is no change of importance in these stopes since last report. Are doing considerable repairing on this level and hoisted from same during week 140 cars of ore. 1300 level.—Are stopping out ore below this level north and south from the winze. Are also working at the new station and chuta at the head of main incline, and re-timbering north drift from the station. Extracted from this level 38 cars of ore during the week. 1640 level.—Have cleaned out and re-timbered incline a distance of 15 feet the past week. Hoisted during the week 426 cars of ore. Shipped to Brunswick mill 427 1900-2000 tons. Average assay of railroad car samples of ore shipped to Brunswick mill for the week \$22.37. Average battery assay for the week \$15.89.

OCCIDENTAL.—Have stopped work in west crosscut from the south drift, 400 level. North and south drifts on this level are in 39 and 49 feet; both show some pay ore. North drift, 450 level, is in 51 feet and continues in fair-grade ore. West crosscut No. 2, 750 level, is in 50 feet and continues in low-grade ore. The main north drift is in 443 feet from winze station. The Sutor tunnel drift is in a total distance of 576 feet.

Tuscarora District.

NAVAJO.—*Times-Review*, May 27: Stopes above the 350-foot level are looking same as at last report.

UNION MILL.—Mill running, crushing 1644 tons Nevada Queen ore for the week.

BELLE ISLE.—West crosscut, 250-foot level, extended seven feet. North drift, same level, extended seven feet. North drift, 350-foot level, extended four feet.

GRAND PRIZE.—Concentrator running on Nevada Queen ore; crushed 473 tons and 100 tons combination during the week; now running all Nevada Queen.

NORTH BELLE ISLE.—No. 1 north drift, 400-foot level, extended 19 feet. No. 1 upraise from this drift extended 19 feet. South intermediate drift above the north 500 extended six feet, showing good ore in fair quantity. The various stopes are looking better than at last report.

NEVADA QUEEN.—Second level.—East intermediate from No. 1 chute, stopes have been started. West intermediate drift has been run 12 feet, in ore. South side of drift is all first class, will average about \$200 per ton; on north side, 1½ feet of first class, balance second class; Stopes started 15 feet from the chute (No. 1) have broken into the ore, from the footwall up

—14 feet—no hanging wall as yet. The ore extracted is one-fourth first class, average assay \$190 per ton, the balance second class, average assay from battery 29.72 per ton. East intermediate stopes from No. 2 chute have two feet \$185 per ton; west stopes from same chute, the ore is never four feet, average 220 per ton. East intermediate from No. 3 chute advanced 16 feet; south from same 15 feet and west five feet, connecting with No. 5 chute. From No. 5, have run 12 feet toward No. 6, and east from No. 6 five feet, one foot of first-class ore in both drifts. No. 7 and No. 6 chutes have been connected, exposing ore all through. South drift on west vein has been run 15 feet exposing one foot of ore, assaying \$250 per ton. North drift extended nine feet, one foot of fair grade ore. Stopes between the south and north drifts are looking well. No. 1 winze from south drift is down 20 feet, exposed 1½ feet of first-class ore, but not looking so well in the bottom. The above openings have produced for the week 117 cars of ore, average battery assay \$269.80, and 610 cars second class, average assay from concentrator \$29.72 per ton. Third level.—South intermediate drift from chute No. 3 has been run 16 feet, following ore two feet wide; produced four cars ore average assay \$375 per ton, eight cars second class, assay value \$45 per ton. Have received from Union Mill Company on account of ore, \$30,000.

Ferguson District.

PROGRESS OF THE CAMP.—*Pioche Record*, May 28: As depth is attained on the April Fool mine, the showing of an immense body of ore becomes greater. The owners are preparing to make a shipment to Salt Lake. Parties are driving an artesian well on the edge of Dry Lake, near here. While out in the hills the other day, J. A. Denton found an old prospecting outfit, which was evidently used 20 or 30 years ago. The find included several picks, a gold-pan and several other articles used in prospecting, and was no doubt used by some early '49er. From a sample of ore taken from the prospect owned by S. R. McLaughlin, James Pierson and W. C. Glissan, an assay made in Pioche went \$13 860 in gold to the ton. The ledge crops out of the ground for several hundred feet, and would indicate the presence of a large body of ore.

ARIZONA.

COPPER BULLION.—*Prescott Courier*, May 28: A carload of copper bullion from Copper Basin is piled upon the platform of the P. & A. C. depot for shipment. Teams are now steadily employed hauling coke to the smelters and bringing back bullion on the return trip. Peery & Kerr, two old-timers of Stanton who have several very good mines, have settled their differences and started to open up their properties, and, with a good stamp-mill at Stanton owned by Mr. Kerr, will very soon be in the bullion market, as their properties now have stored on dumps much richer ore that will be milled very soon. The placer ground near Stanton, of which Mr. Fuller is superintendent, is a very valuable property. Excavations have been made for his extensive plant; the four miles of pipe is laid and water is running to the sight that will be the first point of opening. Tests show an average of \$1.30 per cubic yard. The machinery is expected to reach the ground by June 10th.

GOLD ORE.—*Prescott Courier*, May 28: Dr. Lewis has just returned from a trip to the Yarnell mine, Stanton and the Weaver district. The Yarnell is dropping 20 stamps as regular as clockwork, on good grade gold ore. The water supply is limited at present, but he affirms that, with a pipe line from the Genung spring and a tram from the mine, a constant output of at least \$500 per day would be yielded. The gold is as pure as is ever found in ore. The ore bodies on the surface show several hundred thousand tons of ore of remarkably uniform richness, and under the excellent management of Mr. Palmer the Yarnell will be, in the near future, one of the heaviest ore producers of Arizona. The mill cannot be surpassed for neatness and working capacity for 20 stamps in any country. The daily output now, with all disadvantages, will not vary far from \$400. Much credit is due to Mr. Palmer for his nerve and judgment in struggling against such adverse circumstances as he has, and if our merchants and men at home will only realize that this country is their country, and look to the real worth of their mining interests and foster them a little closer, they will realize that they have many more mines within their easy reach, and instead of groaning and lamenting the dull mining outlook they will realize profit in the immediate future. What they want is not to try to drag in Eastern capital and reap a harvest from them, but foster, encourage and give substantial aid to those at home trying to develop their mining claims, and a mineral world will open up that will be sought by outside investors with capital.

RICHER THAN EVER.—*Phoenix Gazette*, May 22: Tom Greenhaw made some valuable locations in the Harqua country during his trip out there, and says he expects to clear a cold \$50,000 within a year. Everybody is in good spirits in that district, and have great faith in the future of the camp. Another big cleanup was made in the Bonanza last Sunday. The ingot of gold secured this time is ten pounds heavier than the \$81,000 one brought in a short time ago. The nugget weighs 350 pounds. The San Francisco parties who are trying to buy the mine have not closed the trade yet, and Mr. Hubbard says he would rather they would not, though he will come up to his part of the trade if they want to close the deal. They have had a thorough survey made of the mine, and have had the lead tested from top to bottom in every opening, and the experts have gone to Frisco to report. They ex-

pressed themselves as being very highly pleased with their examinations, and there is not much doubt but that the mine will be sold.

ENCOURAGEMENT.—*Enterprise*, May 28: The mining industry of Southern Arizona has received considerable encouragement of late, by the advent of men believed to be good, practical mining men, and the experiments now being made in Washington Camp have awakened new life in the many who for years have bed unquestioned faith in that camp's future. Chloriding is carried on with fair success, and the ore shipments from Crittenden testify to the merits of that section. The Holland mine, until recently so industriously worked by York, Fitzsimmons and others, is now turning out a handsome product of about 60-oz. concentrates. Mr. R. R. Hedley, the head of the company now operating the mine, has the reputation of being a thorough smelting man, and at present is in New York, presumably for the purpose of new machinery, while his partner, Chas. Taylor, remains at the mine, superintending the management there. The Belmont mine, owned by Bacon, of San Francisco, and Tom Yarkes, formerly of this place, is said to be hoisted to Denver parties for \$200,000, and if the sale is consummated, as it is believed it will be, the low-grade base ores of Washington Camp mean more to Pima county than all its other mining sections combined. At present it is only a matter of money and method of treatment.

NEW MEXICO.

ROLLS BY MAN POWER.—*Silver City Enterprise*, May 27: A return to the primitive method of crushing and concentrating the tin ores of Cornwall has been successfully tried at Central City by Harry McAllister. The plant consists of a pair of Cornish rolls driven by the aid of man power only. The capacity is two tons per day. The first run of 1400 pounds of light surface ores, carrying from \$8 to \$10 per ton in silver and about 20 per cent in lead, on being concentrated, assayed \$25 per ton in silver and 60 per cent in lead. The experiment thus far has been very successful and is a step in the right direction, besides demonstrating that the ores of Central City can be successfully and economically treated. The Texas, at a depth of 90 feet, not only holds its own with depth, but is gaining in value. The ore vein is continuous and is of the same general character which has paid for securely timbering the shaft, erecting a blacksmith shop, purchasing a whim and all expenses incident to mining, besides leaving a balance to the credit of the mine, a feature which rarely occurs in sinking a shaft. At 100 feet in depth, drifts will be run and the mine opened for extended development.

PINOS ALTOS.—Bell & Stephens started their mill on Monday, on Pacific ore. The teams of the firm have been employed for the last few weeks in freighting and getting their farms and orchards in shape for crop-raising. During this time a pan was fitted up in the mill and the old tailings from ores milled from the mine 25 years ago by N. Y. Ancheta and others were again run through, returning about \$9 per ton. As 20 tons per day were run through one pan with the labor of a couple of men, it proved a very profitable business.

ALHAMBRA.—Drifting has been commenced from the bottom of the shaft on the Alhambra mine at Alhambra. The vein matter encountered indicates the near approach to one of the rich native silver ore chutes so frequently found in this mine. The Hobson is showing well and will soon be shipping high-grade ore. Alhambra camp, so long known as Black Hawk, has been in a half-asleep and half-awake condition for the past two years, but is now awaking from its lethargic state.

OREGON.

AT CRACKER CREEK.—*Baker City Democrat*, May 28: After an idleness of about three years, the Eureka and Excelsior mines at Cracker Creek are to be operated on an extensive scale. A lease of the property by E. P. Cowen and others of St. Louis has been consummated, and the people of Baker county may now look for an advanced movement to take on in the mining districts southwest of Baker City. Under the lease of the Eureka and Excelsior mines, a new system for the treatment of ores will be introduced, and which will require an addition of machinery to the already splendidly equipped mill plant on the properties. The process of treatment will be what is known as barrel chlorination, and its success is assured, in the opinion of mining men. It is thought that Mr. Jonathan Bourne of Portland is one of the principal persons interested in the lease of the mines, as he has always shown a disposition to bring his company down to business. The machinery for the chlorination process is expected to arrive in Baker City by the first of the coming month.

AT CORNUCOPIA.—Mr. Estes stated that the Eastern Oregon Gold Mining Company, or better known as the Louisville, Ky., Company, Mr. Fred Stein, Manager, was preparing for an immediate resumption of operations on the well known Red Jacket mine, and a full force of miners will be set to work by the first of the coming month. The company is also taking steps to repair the tramway between the Red Jacket mine and the mill, which was the victim of several heavy snowslides the past two winters. With the working of the mine to its full capacity, the tramway repaired, the next step will be the starting up of the splendidly equipped 20-stamp mill and chlorination works of the company, which will occur, it is thought, about July 1st. The faith exhibited by the E. O. G. M. Co., in their investment in the camp, has now more than ever given encouragement to the mine owners of the camp generally, and there seems likely to be an advanced movement

taken on in the camp this season. The Simmons group of mines, which show wonderful richness and permanency, are to be operated quite extensively the present season. Mr. Lou Simmons, the principal owner of the group, has arrived in the camp and is arranging to put a force of miners at work further developing these mines. The Davis mine, owned by Mr. W. F. Davis, and the Last Chance mine, another of the valuable properties of the camp, are expected to resume operations as soon as the snow disappears sufficiently. The Last Chance is a great ore producer and will undoubtedly make a great record this season.

IDAHO.

SILVER CITY NOTES.—*Idaho Avalanche*, May 28: There are 19 men now employed at the Bleina tunnel. Water continues to bother, but good headway is being made. The ore body in the Trada Dollar looks very encouraging, and some large chunks are on exhibition at the office. The strike of gold rock in the Ontario, near the Black Jack tunnel, seems to be the absorbing topic this week. We have seen some of the specimens, and they are covered with the "yellow stuff." They have ten inches of it that will run up in the thousands. Henry Rendolph has located a placer claim in the center of town, between Washington street and Livery Stable avenue. Considerable interest is taken in the work on the claim by citizens. The Phillips and Sullivan shows up in great shape. The gold ore they are now stoping will easily average \$200 per ton, while the silver portion of the ledge looks fine. Surface water bothers them some, but in a few days will cease, as the snow will soon be gone. At the Black Jack tunnel, drifting on the ledge to the south continues, and they have passed the break in the gulch and the ledge has straightened out to its regular proportions and trend. Considerable quartz and ledge matter is coming in, and it is only a matter of a few more shifts till they cut the ore shoot.

MONTANA.

TO REBUILD.—*Butte Miner*, May 28: The greatest and best news with relation to Butte's principal industry, mining and smelting, was received from Boston last Monday, when orders were issued by the Butte and Boston Directors to rebuild the burned plant here. From the time of the fire until the order came to rebuild there was some apprehension felt among the people of the city, as it is a well-known fact that inducements were offered the company to re-erect the works at Great Falls. The construction work is now under way, and in less than six weeks the stacks will again begin to emit the old-time signs of prosperity; at the company's mines not much work is being performed at present, but it is only a question of a short time when full crews will be put on at each property. Development has been progressing, however, and by the time the smelter is ready for business the mines will be in better shape than ever before. On the Anderson, one of the company's claims, a shoot of rich ore was encountered a few days ago, and from indications it is likely to prove very productive.

BLUE WING SHUT DOWN.—At the Alice, the only change to be reported from a week ago is the closing down of the Blue Wing, which occurred last Thursday. The reason for this move is that the property contains a large quantity of very rich ore, and while it is the desire of the company to keep a portion of the works running, it is not the intention to work up the rich ore of the Blue Wing in so doing when the mill can be supplied from the Alice proper and the Magna Charta. The ore reserves of the Alice Company are quite large, and when the time arrives—which will be when silver recovers from its present pauperism—these reserves will be utilized. Everything about the mill and hoisting works is working smoothly, and the manager and employees are consequently happy.

WASHINGTON.

A MILL FOR THE TRIUNE.—*Okanogan Outlook*, May 28: Mr. James Lockwood returned Sunday from a trip to Spokane, where he went in company with Messrs. Schepstur and Sharpneck to close a deal with the owners of the Triune gold mine and Mr. Sharpneck, whereby the latter contracts to furnish and put up on the ground a complete ten-stamp mill for a third interest in the mine. Mr. Sharpneck has gone to Chicago to buy the machinery for the mill, which will be one of the best equipped of the kind in the country. The contract calls for a ten-stamp mill, with power and capacity for operating 20 stamps of 850 pounds each. The plant consists of a 50-horse power Corliss engine, ten 150-pound stamps, one rock-breaker, two automatic feeders, two concentrators, and electric light for mill and mine. An iron track will be laid between mill and mine and the ores taken in cars from the dump and emptied right into the hopper. As soon as it is demonstrated that the mill is a success, its capacity will be increased double or treble what it is at present, as the ore supply is almost unlimited. An idea may be gained of the extent of this ore chute from the fact that it has been prospected for 80 feet in width and 3000 feet in length. It is actually a mountain of ore, and some of it is exceedingly rich in free gold.

TO RESUME.—Preparations are being made to resume work on both Arlington and First Thought mines on Ruby Hill. A force of men was put to work this week building a wagon road from the Arlington down to Tunnel No. 3 of the First Thought mine, where large chutes are being built for the reception of ore from the different mines on the hill, and which will be carried by a bucket tramway to the mill below Ruby.

MECHANICAL PROGRESS.

The Edwards Tinning Machine.

The Edwards machine, recently introduced in Welsh tin plate mills, is thus described by a reporter of an English paper: The operation of dipping and rising tin plates is so mechanical that it is difficult to see how workmen can claim that any large degree of skill is required. The wet plates have under the present system to be taken singly, pushed down between the rollers, by which they are taken through the palm oil and tin (twice) by Mr. Edwards' first patent, and then on emerging, they have to be taken by the riser carefully with a tongs (so as not to disturb the tin before it sets) and placed on the cleaning tables. Except attention to the temperature of the bath little of human skill seems to be required. And now to the machine. There was, of course, the big iron base for the bath, in which, down out of sight, a series of continual rollers is fixed, so as to take plates right through the process mechanically. It is above this bath that the new machinery is fixed. At the end at which the plates are put in is a sort of huge "fork," with two actions. The wet plates are placed in two stand up piles within reach of one set of long prongs, which descend. These have "suckers" fixed at the end, which attach themselves to the corner of the plate, and lifting it, allow the air to go underneath, and so separate it from the rest of the pile; it thus drops into the bath, and the other set of prongs then descends and pushes it down till it catches the rollers underneath the oil. The other part of the invention is more complicated. By means of revolving clutches the tinned plate is seized, taken over the roller, when it falls automatically into a traveling rack, which conducts it to the cleaning table, where it precipitates itself. The whole thing struck me as being exceedingly ingenious, and, although I did not see it in active operation of turning out tin plates, it seemed to me to be quite likely to succeed in the object in view.

Testing a Lathe.

To test a lathe, the first operation is not to put the centres in line at a distance of from two to ten feet, according to the size of the lathe. Call it a small one, and let the test distance be three feet. Pick out a piece of shafting of this length, which is big enough to hang in the lathe without springing, say from two to three inches in diameter. Square up the ends of the piece, centre it nicely, and make sure that the centres are drilled deep enough that they will not bottom. Put a pin in one end of the test piece so that it can be put in the lathe without a dog. Then with a sharp tool turn a short space as close to the head end of the test-piece as possible, and if the tool can be set right, turn to the very end of the metal.

Then, without moving the tool, take the work from the lathe and turn it end for end. Then run the carriage down to the tailstock, put the work back in the lathe with ends reversed, and see if the tool—without being moved laterally—will cut the same as when at work at the other end of the lathe. It must be understood that the tool, when making this test, should be set exactly level with the centres, and not above or below sometimes operated.

If the tool will continue to cut so that the calipers show no variation in size of the work, then the lathe is in line. If not, the tailstock must be set over until the tool cuts the exact size started at the other end of the lathe.

When the above conditions have been met, remove the tool and put in one with a very fine point and adjust it so that it will stand at the exact middle of the end of the live centre. Then run the carriage back, knock out the live centre and put a stick three feet long in its place. Whittle down the end of the stick so it can be driven into the seat of the live centre and make the outer end of the stick smooth and square. Then run the carriage up till the tool just scratches the end of the stick. It should make a point in the end of the stick, and will if the lathe is true, otherwise it will describe a small circle. Next, run the tool out of the way and run out the tail-spindle until it touches the stick. If the lathe is true, the centre will go into the little hole made by the tool.

If out of truth, the direction of the tool-mark from where the tail-centre touches will serve as an indication of how much the lathe is "out," and which way the headstock must be moved to make things come right. The necessary adjustment must be done by scraping the vee on the under side of the headstock, so that the latter will be

twisted around square with the ways of the lathe. It is usually the case that corners, diagonally opposite, have to be cut away, and a good deal of care is necessary that the cutting is not done in the wrong place.

The stick used should be planed true, in some symmetrical form, no matter whether square, round or octagon, but it should be of such a shape that the bending or sagging of the stick from its own weight will be the same, no matter what side of the stick is uppermost. This would not be the case if a flat stick were used, but with either of the three shapes first mentioned the bending of the stick will do no harm, because it bends from all sides alike, when the different sides are brought uppermost by the turning of the spindle.

Lathe builders have a special rig made for this purpose, consisting of rigid metal bars, or light rods stiffly trussed for use in place of the wooden stick.—The Tradesman.

Steam Engine Efficiency.

At the recent meeting of the American Society of Mechanical Engineers in this city, a paper by Prof. C. H. Peabody, of Boston was read "On Economy and Efficiency of the Steam Engine." The author said that while it has been customary to state the performance of a steam engine in pounds of steam per horse power per hour, this method is open to objection, since the value of a pound of steam depends on the pressure and quality of the steam. The desirability of substituting the British Thermal Unit has been urged to the attention of engineers. This unit, sometimes called the pound degree, is the unit required to raise one pound of water 1° of temperature, or, exactly, it is the heat required to raise one pound of water from 62° to 63° F., and it is equivalent to 778 foot pounds. This method has a further advantage, inasmuch as it is applicable to any heat engine, such as a hot air or gas engine. The method of stating engine performances in British Thermal Unit is advocated because it affords a simple and correct way of finding the efficiency of the engine. The ordinary definition of the efficiency makes it a ratio of the heat changed into work to the heat consumed. Now, the horse-power is equivalent to 33,000 foot pounds per minute, equivalent to

$33,000 \div 778 = 42.42 \text{ B. T. U. per minute.}$ This constant divided by the heat consumed per horse power per minute will give the actual efficiency of the engine.

In order to show how well an engine is doing it should be compared with the performance of an engine which has no waste or losses—viz., with a perfect engine. If the cylinder walls of an engine could be made of some nonconducting substance, then such an engine could be made to work on the cycle closely resembling that of the perfect engine. The author then goes on to more fully explain the methods to be pursued in ascertaining the performance of an engine in British Thermal Units.

SLOWING PROPELLERS.—Damage to steamship machinery is often due to the rapid revolution of the engine when the propeller screw is thrown out of water by the pitching of the vessel. In order that the slowing of the machinery may be done in an automatic manner, an English inventor has devised an arrangement in which the sea water operates the controlling mechanism. The contact-making device consists of a tube in the stern of the vessel, connected with the sea, and having a float acting upon an electric coil. When the water about the stern of the ship is at a low level, and the screw is uncovered, the water in the tube flows out, and the float falls, and the electric circuit is completed. The current acts upon a distribution valve of a governor, admitting steam to one side of the piston, and partly shutting the throttle valve, thereby throwing the top and bottom of the low pressure cylinder into communication and equilibrium. When the water rises in the tube, and the propeller becomes immersed, this electric contact is broken and the controlling valves put back to their normal position.

FRICTION OF LUBRICATED BEARINGS.—At a recent meeting of the Leeds Association of Engineers, Mr. J. H. Wicksteed read a paper on the "Friction of Lubricated Bearings," founded on the researches of the Institute of Mechanical Engineers. After describing the apparatus used, the author began the discussion of the results arrived at, which, he stated, confirmed the deduction drawn from ordinary practice. With careful lubrication, steel shafts running in gun-metal bearings at from 50 to 300 revolutions per minute, would seize with the below mentioned loads: Collar bearings, 100 pounds per square inch; footstep bearings, 200 pounds per square inch; cylindrical

bearings, at 500 pounds per square inch; while a pin working intermittently will stand about ten times the above pressure without seizing. In all the experiments the surface was taken as being the diameter by the length. The lecturer pointed out that in the friction of the solids, the friction is directly proportionate to the load, while with liquid friction, *i. e.*, with a perfect lubrication where a film of liquid intervenes between the metallic surfaces, the friction is independent of load. The experiments showed that in a bearing with the load applied above, as in rolling stock, there was an upward pressure of more than 500 pounds, a hole being bored in the crown of the journal, and a pressure gauge inserted showing as much as 600 pounds pressure per square inch in a bearing four inches in diameter by six inches long. Thus a total pressure of upward of six tons was supported by fluid pressure of the lubricant, which pressure did not fall appreciably for half an hour after the experiment ceased. This film of oil would not exceed one thousandth of an inch in thickness.

SCIENTIFIC PROGRESS.

An Experiment with Aluminum.

A brief paper with the above title was presented at the San Francisco meeting of the American Society of Mechanical Engineers by Mr. W. W. Christie, of the Ramapo Iron Works. The author described two iron-aluminum alloys of great hardness, which were produced by him in experimental work. No practical use was ever made of them, and no further experiments were made to determine whether the alloys could be reproduced with regularity. The paper was of especial interest, because the general testimony of investigators is that the addition of aluminum to iron and steel tends on the whole to soften rather than harden the metal. (See *Eng. News*, March 1 and Oct. 11, 1890.) It is possible that the hardness of the specimens described by Mr. Christie was due to some other cause than the aluminum contained; but if the contrary is the case, the fact is a most important one and should be more fully investigated. We reprint the paper as follows:

The composition of the alloy was:

	No. 1.	No. 2.
Wrought iron turnings.....	10 lbs.	10 lbs.
Cast iron turnings.....	10 lbs.	5 lbs.
Steel rail chips.....	10 lbs.	15 lbs.
Ferro-silicate of iron and aluminum.....	2 lbs.	2 lbs.

"The melting was done by a well-known brass-founding firm in their brass furnace. In order to melt the mixtures, very high temperature was required on account of the wrought iron, which requires 3000°. So the crucible was covered with a carbon lid and coal heaped upon it. Even then about three hours' time was required to melt it, and after being melted, the ferro-silicate of the iron and aluminum, which has been left out, was added, and thoroughly stirred in. The castings made were 1½ inches diameter by 14 inches long, cast in green sand without any charcoal facing, and after the skin of sand had been removed from the castings, they were very smooth and clean.

"Mixture No. 1 was very fluid when hot and white, but had to be poured quickly, as it soon cooled. No. 2 was not as fluid nor as white as No. 1. No. 1 made a very homogeneous casting; No. 2 not nearly so much so, and its fracture duller than No. 1, which latter was very bright. It may also be said that pieces of both mixtures which have been on my desk since April, 1890, when they were cast, have retained their original brightness, which speaks well for the small percentage of aluminum in them.

"Mixture No. 1 could not be touched by a specially tempered cold chisel, the edge of which was destroyed. On No. 2 a tool maker used an hour's time cutting off but little, and during that time the tool required, I believe, five or six sharpenings. When heated to a high red heat, they both crumbled when struck with a hammer. When heated to a dull red heat, No. 1 was placed under a steam hammer, and though quite resisting, allowed itself to be flattened to about 1¼ inches thick before crumbling. It gave better results when annealed over one night. No. 2, when heated in the forge to a dull red heat, could be flattened to about three-fourths inch thick.

"A piece of No. 1 was remelted and cast into the usual shape for tension tests. This piece, though but 8½ inches long, was put in a Fairbanks testing machine, but as it was uncertain as to just how it would act, no extensometer was used for fear of the test piece breaking suddenly. Breaking occurred at a scale reading of 13,860 pounds. The piece broke, however, in the jaws of the machine, and in the larger section of the piece, as there was a flaw in it (cinder flaw). For fear

of breaking the jaws of the machine, the test ended here. After breaking the smaller section in the impact machine, the area was obtained by a planimeter as 0.31 square inch, which makes the tensile strength per square inch at the time of breaking 44,710 pounds. This would probably have been considerably higher but for the flaw and untrue grip of the jaws, which caused a combined transverse and torsional strain. The area of smaller section was less than that of the sound portion of larger section, hence its use. When placed on a Heisler impact machine, between supports six inches apart, a weight of 25 pounds falling 1¾ inches was required to break a circular section of 0.31 square inch."

Metals at High Temperature

Professor Roberts Austen, C.B., F.R.S., recently lectured at the Royal Institution upon "Metals at High Temperatures," says *Engineering*, of London. Professor Roberts-Austen pointed out that during the two hundred years which have just elapsed since the death of Robert Boyle, chemists have lamented the want of trustworthy instruments for measuring high temperatures. Wedgwood (1781) and Sir W. Siemens (1782) used almost the same words of regret as Boyle did in the seventeenth century. Siemens, by devising his electrical resistance pyrometer, did much to provide a suitable instrument which would afford trustworthy indications, and H. L. Callendar has since effected certain improvements in this pyrometer which have made it singularly delicate and accurate. The necessity for measuring the heat of comparatively small masses of metal led Professor Roberts-Austen to adopt a thermojunction of platinum and of platinum alloyed with 10 per cent of rhodium, devised by H. Le Chatellier, and later an iridium and iridium-platinum junction, capable of measuring degrees of heat up to 2000 degrees centimeter, which he had himself devised. By the aid of such instruments the lecturer showed the audience the point at which gold passes from its liquid to its solid state, or, in other words, the "freezing point" of gold, 1045 degrees, and of palladium, 1500 degrees. Professor Roberts-Austen then took three typical cases of the behavior of metals at high temperatures. The first is of much industrial importance and relates to the molecular structure of steel at great heats. He showed that on either side of a critical temperature of about 650 degrees, steel is practically two distinct metals, a matter of vital importance in the working of steel, for its neglect has been attended with disaster both to guns and ironclads. The second class selected by the lecturer had an important bearing on the true combinations which can exist between atoms of metals, and a newly discovered and beautiful purple alloy of gold and aluminum was shown to the audience, and it was pointed out that if the early chemists had known that the existence of this alloy was possible, and that the color of gold could be heightened to deep purple, the belief in alchemy would have been greatly strengthened. The third class comprises a statement of the evidence offered by dilute solutions of metals in a metallic solvent as bearing on rival theories of solutions generally, and the lecturer concluded by referring to the fact that the modern chemist strove as earnestly as the alchemists to change elements at high temperatures, and, by attacking their ultimate atoms, to produce transmutations which, as Boyle had said, "would be none the less real for being gainful."

RULING GRATINGS.—The *Optician* says a word should be said as to the difficulties of ruling "gratings" which may explain why so many orders for gratings remain unfilled. In the experience of Mr. Joseph Ames, it takes months to make a perfect screw for the ruling engine, but a year may easily be spent in search of a suitable diamond point. The patience and skill required can be imagined. Most points make more than one "furrow" at a time, thus giving a great deal of diffused light. Moreover, few diamond points rule with equal ease and accuracy up hill and down. This defect of unequal ruling is especially noticeable in small gratings, which should not be used for accurate work. Again, a grating never gives symmetrical spectra; and often one or two particular spectra takes all the light. This is, of course, desirable, if these bright spectra are the ones which are to be used. Generally it is not so. It is not easy to tell when a good ruling point is found, for a "scratchy" grating is often a good one, and a bright ruling point always gives a "scratchy" grating. When all goes well, it takes five days and nights to rule a six-inch grating having 20,000 lines to the inch. Comparatively no difficulty is found in ruling 14,000 lines to the inch. It is much harder to rule a glass grating than a metallic one; for to

all of the above difficulties is added the one of the diamond point continually breaking down. For this reason, Professor Rowland, who is an expert in their manufacture, has ruled only three glass gratings. One of them has been lost, and the other two are kept in his own laboratory. These two were used by Dr. Bell, the telephone man, in his determination of the absolute length of the *D* lines.

ELECTRICITY.

Developing Plants by Electricity.

The employment of electricity in horticulture forms an interesting subject for experiment and investigation, and results have already been obtained that justify the hope that the idea may soon be turned to practical account on a scale of considerable magnitude. Spring vegetables have already been forced by its aid for market, and there is no doubt that roses and other flowers can be made to bloom more plentifully and more profitably with its assistance. The Department of Agriculture at Washington has been experimenting in this direction for some time past. It has been found that lettuce is particularly susceptible to the influence of the electric light, by means of which, it is said, it can be grown for market in two-thirds the usual length of time. Other vegetables respond likewise in varying degrees. But everything depends upon the proper regulation of the light, and how to do this can only be learned by careful study of the results produced under all sorts of conditions. The effect of electricity being to hasten maturity, too much of it causes lettuce to run to seed before the edible leaves are formed.

Electricity is not employed for such purposes as a substitute for sunlight. It is merely used in a supplementary fashion. The greenhouse that has the sun in the daytime is illuminated at night with arc lights, toward which the plants incline their leaves and flowers. It has been supposed hitherto that vegetables required intervals of darkness for their health and development, just as animals need sleep, but it has been shown that, supplied with electric rays, they will go on growing thriftily between sunset and daybreak.

The electric gardener usually employs opal globes to diminish the intensity of the light. When the lamp is left bare and permitted to shed its unshielded rays upon the plants the latter grow pale, run up quickly in sickly stalks and soon die. It remains to be discovered exactly how much light is beneficial, and during precisely what period of development of the vegetables it ought to be applied.

The influence of the light upon the color and productiveness of flowers has been shown to be extraordinary. Tulips exposed to it have deeper and richer tints, flowering more freely and developing longer stems and bigger leaves. Fuchsias bloom earlier under like conditions. Petunias also bloom earlier and more profusely, growing taller and more slender. It is the same way with many other flowers. In fact, there is every reason for believing that the electric light will be very profitably used in future as an adjunct to forcing establishments for both flowers and garden vegetables. Already one market gardener in New Jersey is employing it with a success which he reports as marvelous.—*Western Electrician*.

NOT DANGEROUS.—The tendency to exaggerate the dangers of electricity has invariably been an accompaniment of its introduction for various commercial and other uses. We say exaggeration, for, when accurate statistics have been forthcoming, it has been found that electricity has not been such a "fell destroyer" as daily press articles have led us to suppose. It was so with electric light currents, and the same old cry has gone up now against the "deadly trolley" of the electric railway. The figures recently published by the city of Boston show how unfair this cry has been, and the fact that the trolley is not half so black as it is painted, for in one year the West End electric cars carried 119,000,000 people, which is many more than all the railroad lines in and out of Boston carry. In one year the number of deaths on suburban railways was 20. In the same year five people were killed by horse cars in Boston, and only three as a result of accidents by electric cars. But the cry will not cease yet. Our contemporaries of the daily press must have something to enlarge upon, and electricity is so mysterious. If they do not get the matter just right—well, the dear public don't know.—*Electrical Review*.

STOPPING ELECTRIC LOCOMOTIVES.—Heretofore, in electric railway work, it has

been largely customary to reverse the current in order to stop the car quickly, which results in a considerable waste and causes a tendency to burn out the motors. In order to obviate this difficulty, Mr. Sidney H. Short of Cleveland, Ohio, has devised an arrangement by means of which the motors are disconnected from the ordinary supply wire and connected in a local circuit with each other in such a way that the current generated in the local circuit and acting on a motor, tends to check the forward movement of the car. The two motors of a car are connected in the local circuit, so that the electromotive force of each under the rotation imparted by the forward movement of the car opposes that of the other and tends to produce a current in such a direction as to increase its own field magnetism and cut down that of the other. The car will thus be checked or brought to a sudden stop if running rapidly, and, if on a heavy grade, will creep slowly down without taking current from the supply wire and without having the brakes set. In effecting this, one motor overpowers the other, owing to the difference in the residual magnetism of their fields, and reverses the field polarity of the weaker motor, which is thereupon operated in such a direction as to run the car backward by the current from the more powerful motor, acting as a generator.—*Electric Engineer*.

STORAGE BATTERY WORK IN FRANCE.—Another attempt to reconcile the storage battery with the requirements of traction work is being made by a street railway company in Paris. The plan under consideration differs somewhat from the methods usually employed, in that the motor car is devoted entirely to the machinery and batteries, without carrying any passengers. These cars will haul one or two trailers. The motor trucks are peculiar in being composed of two wheel trucks, two of which are flexibly connected beneath the center of the car. The car body rests on rollers, one at each corner of the trucks, thus allowing the axles to turn through a considerable range and conform to the curves of the tracks without producing undue friction. The regulation of the car is effected by commutating both the motors and the batteries. The two motors are in series at starting, and are thrown in multiple for the second speed. The remaining speeds are made by the different combinations of the batteries. These are divided into four trays, and are used first, four in series; second, two in multiple series of two; third, four in multiple. These, with the two speeds of the motors, give four speeds for the car, the highest of which is only permitted outside of the city limits.

ON HEAVY TRAINS.—Electricity promises to be very extensively used for operating heavy railroad trains, particularly within city limits, where freedom from the smoke and gases, which are inseparable from a steam locomotive, is demanded. The success which has attended its use in street car work has attracted the attention of railroad managers, and already the engineers of the Wisconsin Central, the Illinois Central, the Pennsylvania and the Boston and Maine roads, are making exhaustive investigations of the various systems with a view to recommending to their lines the adoption of the one best suited to the heavy work which will be required of it. Two of the most eminent electricians in this country, Prof. Henry A. Rowland and Dr. Louis A. Duncan, have expressed the belief that, upon a carefully constructed road, electric cars could attain with safety, speeds which would not be possible with steam cars, the limit of safety being placed by them at 120 miles an hour. The practicability of using electricity for moving heavy freight trains will soon be satisfactorily demonstrated by the 22-ton electric locomotive which is being constructed at Whitinsville, Mass., and which is intended to haul six or eight freight cars of an aggregate capacity of 300 tons.—*Edison Monthly Record*.

MR. SIMS, one of the inventors of the Sims-Edison torpedo, has prepared drawings of a life-boat made on the same principle as the now famous torpedo. The propeller is to be placed in the stern of the boat, which is to be provided with three or four miles of cable and an electric search light. The current for propelling the vessel can be generated at a shore station several miles from the starting point of the lifeboat.

It is announced that the electrical decomposition of salt on a commercial scale is now being carried on in Switzerland. The company's works are situated near the river Orbe, and by utilizing a waterfall, 3,000 horse power is gained, and electrically transmitted to the factory, which is 300 meters distant.

GOOD HEALTH.

Milk Supply in Cities.

Wm. T. Sedgwick contributes to the *Technology Quarterly* an article from which we take the following:

Milk, to a great extent, man still uses much as his primitive ancestors used it; namely, in the raw or uncooked condition. And yet the milk of a modern city is altogether different from the milk consumed by primitive man. It is seldom fresh; it is often adulterated, and it is usually dirty. The stable, and travel more or less prolonged, have had their effect, so that the milk when delivered is often far along on its way toward decomposition.

Milk is an animal secretion prepared in much the same way as are the tears, the bile, the gastric juice, the urine, the sweat, and the saliva. It is secreted in the mammary gland, or udder, by certain epithelial cells which manufacture it from the blood. During the process of secretion these cells break open and contribute of their own substance to the mixture of water, salts, sugar, and fat, which constitute milk. At every milking a portion of the udder substance, the actual animal stuff, is given off; and thus it comes to pass that milk is strictly an animal food, like an infusion of muscle or of liver. It is unnecessary to say more to make it plain that it is highly unstable, highly decomposable, highly putrescible.

It is well known that milk, especially as it is found in large cities, is usually swarming with living bacteria. Most of these are probably harmless vegetables; nevertheless they constitute a host of organisms entirely foreign to the milk itself. The so-called "pure" milk ordinarily obtained in cities, even when it has not been tampered with, frequently contains in a teaspoonful millions of these microscopic vegetables, luxuriantly thriving in a soil most favorable for their development. Moreover, although themselves invisible, they do not fail to produce obvious effects. The souring and chemical decomposition of the milk, which soon appear, are due exclusively to their vital activity, and the milk which was originally sweet, and which in their absence remains forever sweet, becomes, owing to their activity, sour and chemically decomposed. In this condition it has important uses, but it is no longer "fresh" or "sweet" or "normal" milk. Under the worst conditions milk may actually be delivered to the consumer nearly or quite sour. That milk must be regarded as normal which is drawn from the teat of a healthy cow. In such normal, or udder milk, we have found no trace whatever of bacteria.

There are two principal sources of the bacteria in milk; namely, contamination during the act of milking, and the natural multiplication of the bacteria thus introduced during the interval between milking and the consumption of the milk. The result of these investigations was to show that even under the most favorable conditions, cow's milk as ordinarily drawn, becomes, almost necessarily, infested with hosts of putrefactive bacteria at the very outset. Under worse conditions, with unclean stables and dirty milkmen, to say nothing of half-cleaned pails and cans, it is easy to understand why milk swarms with bacteria; and if we allow time also, the wonder is, not that it contains so many germs, but rather that it is still potable at all.

When we reflect upon the indescribably filthy condition of many cow stables; upon the fact that the cow's udders and flanks are not infrequently covered with flaking excrement; upon the quality of the men employed to do the milking, etc., etc., it becomes a simple matter to understand how this rich animal fluid—sterile at the start, but drawn by unclean hands into half-cleaned pails, and meantime sprinkled from above by the dust of the stable, by hairs, dandruff, dirt, and particles of excrement from the skin and udder of the cow vigorously shaken by the milker or brushed by his hat—becomes infested with organisms. That these multiply swiftly and enormously in the warm and rich fluid, well aerated by the act of milking, is also a natural consequence of favorable conditions.

Tannin in Tea.

"Some examples which have been forwarded to us," says the *British Medical Journal*, "of the results of analyses for tannin and theine in tea indicate considerable variation in the amount of tannin, according to the quality of the tea and the state of growth at which it is picked. In some blends of China teas the percentage of tannin extracted by infusion for thirty minutes was 7.44; theine, 3.11; and a similar result was given in the examination of

the finest Moning; while, on the other hand, with fine Assam tea a percentage of 17.73 of tannin by weight was extracted after infusion for fifteen minutes, and two blends of Assam and Ceylon tea gave, respectively, 8.91 and 10.26 of tannin. On the whole it is probable that the Indian teas are much more heavily loaded with tannin than the China or Japan teas. Moreover, the common method of prolonged infusion in boiling water is well calculated to extract all the tannin, while it dissipates the flavor of the tea. To be drunk reasonably, tea should not be infused for more than a minute, and with water of which the temperature does not exceed 170° F. It should be taken without sugar or milk, which would drown the flavor of the delicate and aromatic infusion thus obtained. This at least is how tea is drunk both in China and Japan, whence we have borrowed the use of it. With our European method of prolonged infusion in boiling water we destroy all the best flavor of the tea, and we extract such heavy proportions of tannin as to cultivate indigestion as the result of tea drinking. Indigestion is unknown among tea drinkers in the East, and it is in all probability only the result of our defective use of the leaf."

USEFUL INFORMATION.

PETROLEUM FUEL.—Petroleum fuel for locomotives has been successfully introduced in South America, says *Engineering News*, on the Argentine Great Western Ry., native oil being used; but it is said that the supplies have given out, and the engines have once more to work with coal and wood. The petroleum deposits are situated in the province of Mendoza, and are the property of the Mendoza Petroleum Co. The crude oil, of a consistency resembling very coarse molasses, is brought down in a four-inch pipe to the works of the company, a quarter of a mile from the railway station, and is stored in a large tank reservoir, with a capacity of 3000 tons. It seems that the company has not carried its borings deep enough, and will have to make further sinkings to secure the constant supply which the deposits are expected to yield.

NEW ALUMINUM PROCESS.—M. Faure has recently invented a process of producing aluminum, by means of which he hopes to reduce its price to about 8d. or 9d. a pound. Briefly speaking, his proposed method consists in obtaining in a cheap manner, aluminum chloride, and decomposing it electrically. This decomposition can be effected with a smaller potential difference than can the fluoride now most frequently used for preparing aluminum by electrolysis, and at the same time a valuable by-product is formed in the chlorine liberated. It is said, however, that there are considerable difficulties in the way of making the proposed process a commercial success, which, it is feared, may prove insurmountable.

AN ELECTRIC MOUNTAIN RAILWAY.—An electric mountain railway is now approaching completion in Upper Savoy. The line starts from Etrembeieres, on the Bellegarde and Annecy railway, and runs in a circular sweep through Monnetier to Veyrier, a branch being run up the Grande Saleve. The gradients range from 16 per cent to 35 per cent, with curves ranging from 165 to 115 feet radius. The generating plant comprises three Thury dynamos, coupled to turbines. The motors are four-pole, each car being provided with two 33-horse power motors and two sets of gearing. Along the track inverted Vignole rails, supported on iron posts and brackets, form the electric conductor. A 15 per cent loss on the line is allowed for.

An ingenious apparatus for ascertaining the depths of rivers and smaller streams, has recently been successfully tried on the Elbe. It consists of a curved arm, hinged at the upper extremity, and of a length sufficient for the lower curved portion to trail on the bed of the stream. The greater the depth of the stream, the more will the arm be inclined, and hence by suitable recording mechanism the depth can be automatically registered.

A PROPOSITION to build three steel observation towers in Chicago—one in each division of the city—has been made by Mr. C. H. Merrill, and the Council Committee on Buildings has reported favorably on the erection of one tower as an experiment, which will probably be located in Lincoln Park. The tower is to be 350 feet high, 87 feet and 40 feet square at base and top, and the estimated cost is \$150,000. An elevator will carry passengers for a charge of 25 cts.



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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Stamp Mill and Concentrators for Sale—Coronado Foundry & Machine Co., Coronado.
 Dividend Notice—Pacific Coast Borax Co.
 See Advertising Columns.

Mining When They Should Not.

A dispatch from Yuba City says: "Agents of the Anti-Debris Association of the Sacramento Valley have filed a report of their recent visit to the mining regions of Nevada, Sierra and Plumas counties. The watchmen found that there were 29 hydraulic monitors which have been worked this season, 11 of them being now in active operation, and none of them have made any attempt to restrain the debris, notwithstanding the decrees of the courts, the law and the promises on the part of the miners to abide by the decisions until Congress takes some action. In some instances, large quantities of earth are being washed into the rivers. Some of the mines are operated by Chinese, but these are in the minority."

We regret to be obliged to confess that there is much of truth in this report. Whether the men who have been working have all been duly enjoined we have no means of knowing; if any of them have not, then they break no law, since no general law against hydraulic mining has ever been passed. Under present conditions, each individual mine must be enjoined. When this is the case, and they persist in mining, the laws are broken.

And not only do these men violate the

decrees of the courts, but also the promises and pledges of the Miners' Association, which has been fighting their cause before Congress. They deserve and will get no sympathy whatever if they are heavily punished.

The California Miners' Association has no power over those miners who are not members, and is not even in a legal position to exercise control over those who are. It has endeavored in every way to impress upon owners of hydraulic mining property the necessity of obeying the decrees of the courts. Circulars have been printed and sent broadcast, and letters sent to individuals, urging the necessity of desisting from illicit mining in every way. The members of the Executive Committee have found this question the most difficult one they have had to handle, for there are plenty of men—in this business as in others—who will ignore decency, honor, promises and everything else for ready money.

It was long since recognized that it would be almost impossible to control these men when the water came in the spring. They have continued to work in the spring in years past before there was a Miners' Association, and some of them continue it now. The Anti-Debris Association must deal with them as it has before.

The Anti-Debris Association agreed to withdraw its "spies," or "watchmen," after the Miners' Association issued the circulars calling upon miners to stop mining until Congress settled this question one way or another. But as some miners have failed to obey this call, no one can blame the Anti-Debris people from again looking after their interests.

It is greatly to be regretted that there are men so blind to their own future interests as to persist in doing these acts at this critical period for hydraulic mining. The bill to permit the construction of restraining dams, having favorably passed the committee, is ready for the action of Congress. The miners are supposed to be quietly awaiting the result of this action. But here we find a number of them, totally ignoring pledges and promises, going on with work, and again arousing those feelings of animosity happily quelled for a space. They furnish their opponents a powerful weapon, and belittle their own association in the minds of the public.

A number of busy gentlemen have given their time and a number more their money to help the hydraulic miners resume work on a basis which will cause no injury to other interests. Yet some of the class so helped entirely ignore these efforts, do as they please, and jeopardize the whole industry for the sake of a few dollars. Of course they are "hard up," but they will be harder up still if they continue this sort of thing, for the next time they have a fight on their hands they will get no outside assistance at all.

But the public should understand one thing at least. This illicit mining is not being done with the connivance or aid of the California Miners' Association or its Executive Committee. The writer of these lines is a member of that committee and personally knows of the strong efforts made to stop it, and the earnest desire to keep and enforce the pledges made at the State Miners' Convention in January last.

The Editors and the Miners.

The editorial excursion party went up to Dutch Flat last week to see a hydraulic mine at work, and learn something of mining. On arrival there the guests were formed in line, with the band and Reception Committee ahead, and marched into the famous Gold Run hydraulic mine, which is owned by Gould & Doolittle. This is one of the largest and most valuable mines of this kind in the world, but has not been worked for nearly ten years, owing to the prohibition of that kind of mining.

The mine was put in full operation for

the occasion and for the first time in their lives most of the visitors saw the monitors at work. They had heard of the power of these devices, but when they saw what they really could do they were rendered almost speechless. The monitors were gayly decorated and painted for the occasion, one of them being named "The Editor" and the other "Governor Markham." They were throwing streams under 300-foot pressure against a high and frowning bank of cement gravel.

A regular miners' breakfast was set out for them, which they all enjoyed. After this they were shown the various methods of gravel mining. Some miners were at work with pans, others with rockers, toms and sluices. A typical miners' camp had also been arranged for the edification of the visitors.

The most interesting exhibit to them, however, was the hydraulic mining. After two hours' work the water was shut off and a clean-up made. The amalgam was retorted and the larger bar was presented to President Capeller of the association, by J. H. Neff, on behalf of the miners. Mr. Neff made one of his usual happy speeches. President Capeller in replying said he and his companions from the East had witnessed a scene that they could never forget. They never dreamed that California possessed such treasure beds. The fact that they had seen for themselves caused them to sympathize with the miners over their inability to wash the gold out, and he promised that each one of them would use his influence to secure for the miners legislation by Congress that will permit hydraulic mining to be resumed, without injury to the rivers or valleys. Mr. Capeller thanked the miners heartily for their generous gift.

The second gold bar was given to Governor Markham, through Colonel Bergin, one of the Governor's staff. The Colonel thanked the miners on behalf of the Governor.

From Dutch Flat the party went over to Grass Valley and Nevada City, where committees took them in charge, and they were royally received. The visitors were taken to the different mines and distributed so that all of the closer mines were reached about the same time. Those visited in Grass Valley were the Idaho, Peabody, Empire, Omaha, Lone Jack, North Star and W. Y. O. D. ("work your own diggings") mines.

At each mine the owners had made preparations for the visitors, providing refreshments of all sorts, and detailing men to show the excursionists around and explain quartz mining to them. Nearly every visitor was given some sort of a souvenir in the shape of a nugget, or specimen of quartz, and to say that they were delighted would be but half expressing it.

At 5:30 o'clock the Easterners reluctantly returned to their train and rode back to Colfax, the section from Nevada City closely following it.

At Colfax the Executive Committee of the California Press Association held a short meeting, and on motion of G. M. Francis the following resolution was adopted:

The last day of the National Editorial Association in California has been an exceptionally pleasant and profitable one by reason of thoughtful courtesies extended, and it is hereby resolved that the thanks of the association are due especially to Messrs. Gould and Doolittle of the Gold Run Mining Company for the excursion planned and so successfully carried out by them, with a view to acquaint the editorial mind of the Nation with California's system of hydraulic mining and the pressing need of such Congressional assistance as will permit this prosecution of that system of mining without detriment to the agricultural interests of the State; also for the breakfast generously spread and the happy illustrations of ancient and modern life in the mines prepared in Placer County for our benefit.

Resolved, Further, that the management of the Nevada County Narrow-Gauge Railroad Company has placed the fraternity under obligations for the delights insured to each member of our party by transporting it over their road through one of the grandest mountain regions of the Pacific Coast, and that the enterprising and great-hearted people of Grass Valley and Nevada City are entitled to be remembered most kindly for favors shown and generous hospitalities extended.

The Hale and Norcross Decision.

The decision of Judge J. C. B. Hebbard in the case of M. W. Fox vs. The Hale and Norcross Silver Mining Company et al. is a revelation to the masses.

That a judge could be found who, in the face of the strongest financial, political and social influences, would decide as he has done in this case, was totally unexpected. He has earned and should receive the everlasting support and thanks of a people who have been systematically robbed, and who now, for the first time, see dishonest millionaire conspirators called by their right names from the bench by an honorable and honest judge. An analysis of this decision indicates new departures in several directions—first, in the matter of the responsibility of the "directors" or "trustees" of corporations. It has always been claimed that "trustees" of corporations, acting for stockholders, were responsible to the shareholders in such corporations, but it has never been so plainly and so pointedly laid down from the bench as has been done by Judge Hebbard in this decision. In it he not only says that the trustees are liable civilly for losses which may be caused to stockholders by their (the trustees) inattention, neglect, or passive permission of fraud; but they are criminally liable as well.

Trustees will not find the formal attendance at meetings, and the drawing of their petty \$5 fee, such a pleasant duty, when they realize that heavy damages and a striped suit are awaiting them if they permit misuse, abuse, or needless waste of the trust property of which they have assumed the management.

There is still another point in this decision which particularly interests shareholders in the Comstock mines, and that is that the product of the "Little Joker" annex (which is attached to the mills on the Comstock to work over the tailings and concentrates claimed by the mill) does not belong to the mill, but to the owner of the ore. The system pursued at present on the Comstock (giving the residues to the mills) is simply equivalent to offering a premium for dishonesty on the part of the millman. No better proof of this can be given than the result of the test run of 110 tons of Hale and Norcross ore at the Occidental Mill. In this run they obtained 4,505 lbs. of concentrates which returned \$721.65 gross to the company, or \$288.66 per ton—the concentrates amounting to 59.78-100 per cent. of the total value of the yield; and this was only \$15 rock. Under the present system these concentrates go to the mill.

If the result of this decision will be the correction of the criminal mismanagement which is and has been the rule on the Comstock, and cause the cessation of the thievery practiced by the mill owners there, then it will have worked a miracle. If it does not, then there is the satisfaction of knowing that there is on the bench at least one judge who will continually punish those who have been guilty. There are grounds enough to pile the damages to the sky; sinews of war in the shape of money with which to prosecute the cases; and men who are willing to devote their time to the business.

If the millmen wish to avoid trouble in the future, they should do as the people have long wanted them to do, and that is turn over the mills to the mining companies who furnish the ores. Then there will be no questions about little jokers, annexes and concentrates. Apparently, at the present time, the possession of, or an interest in a mill on the Comstock is an almost sure proof of dishonesty.

It is impossible for us to give in detail a full analysis of this decision. It is bristling with brilliant points, and evidences by its clear, clean statements, a grasp of the evidence and of the facts and law in the case, which is superlatively complimentary to the writer of it, the Hon. J. C. B. Hebbard.

Chinese Mining Districts.

Continuing our description of the mines in China, attention is turned to the Chao-Yuen gold district, 25 miles from the steamer anchorage at Hung-Kou and 18 miles from the large town of Huang-Hsien. The topography, as shown in the engraving, is extremely rugged. The granite flanks of the Lo-Shan range rise out of the great Shanghing plain. The rise of the range is rapid, the culminating points, within a few miles of the base, being the Lo-Shan, at 2610 feet, and the Ying-Wan-Shan, at 2230 feet. The bedding of the granite has a general strike of N45E, and the quartz ledges, which are all apparently bed-veins, take the same general trend, varying from N30E to east.

No regular mining has been done, although prospecting has been carried on extensively. The best developed ledges are the Ling-Lung-Shan, the Hung-Chin and the Hei Shi-Yeh-Ting. The Ling-Lung-Shan is a large quartz ledge varying in width from 50 to 75 feet, with an east-and-west course, and a dip of 80° to the north. About 400 feet from the bed of the tunnel gave \$1.08 and \$1.38 in gold per ton.

Near the crest of Ling-Lung-Shan the ancient Chinese have done a large amount of work. In some places the rock has been quarried; in others they have followed a streak of ore from 2 to 3 feet wide for distances of some hundred feet; and in another they have made an immense underground working 100 feet long by 50 feet wide, and with an arched roof standing insecurely 30 feet above. Near by there are other places that were probably such cavern workings, but they have now fallen; 1500 feet west of the tunnel is the Hung-Chin series of ledges, bordering each side of a narrow ravine, through which a stream of water flows. On the east side a well-developed ledge of snowy white quartz, 6 to 8 feet wide and nearly perpendicular, has been opened. Several assays yielded \$1.28, \$3.35 and \$4.43 per

core rock, 2 to 3 feet thick, assaying \$27.77.

Ma-Ting lies one mile east of the tunnel and consists of openings in two parallel ledges of quartz, respectively 2 and 8 feet thick, and separated by a horse of granite 5 feet thick. These ledges strike east and

from hills thickly clad with pine, and a passable cart-road connects the mines with the sea-coast, 25 miles distant, affording easy transportation for machinery and, if necessary, for mineral-fuel. In Mr. Clark's opinion, these conditions make the Chao-

A Great Engineering Enterprise in Japan.

The last mail from the Orient brings a very interesting account of the completion and successful operation of a great government work in Japan. Lake Biwa, having an area of 500 square miles, is located seven miles from the City of Tokio and at an elevation of 143 feet. A navigable canal has been cut from this lake to Tokio, involving two miles of tunneling and an aqueduct of considerable length. At the eastern extremity of the city, to which point the canal has been brought, there is a sharp decline of 118 feet from the base of which the canal is continued to the sea. The difference in level is overcome by inclined-plane ways 2100 feet in length, on which boats are raised and lowered from one canal to the other. These ways are operated by electric power furnished from a Pelton water wheel connected with a Sprague motor.

The fall above-named affords also a very valuable water power—a part of which has already been utilized for various mechanical purposes, by means of electric transmission. The power station is located at the foot of the incline, and consists of three 8-foot and two 6-foot Pelton wheels, aggregating about 600-horse power, which are supplied with water from the high level canal by three lines of 36 inch pipe 1300 feet in length, delivering water to the wheels under a head of about 100 feet.

These wheels are at present operating three Edison dynamos of 80 kilowatts each, the power from which is distributed about the city within a radius of two miles; running rice mills, spinning mills, watch factory and various other machinery. One Thomson-Houston alternating current dynamo of 2000 volts supplies the city with 1300 incandescent lights, as well as many arc lights.

The above works—involving an expenditure of \$1,250,000—were planned by and executed under the direct supervision of Mr. S. Tanabe, an eminent Japanese engineer, and their operation is said to be a great success, both from a mechanical and financial point of view.

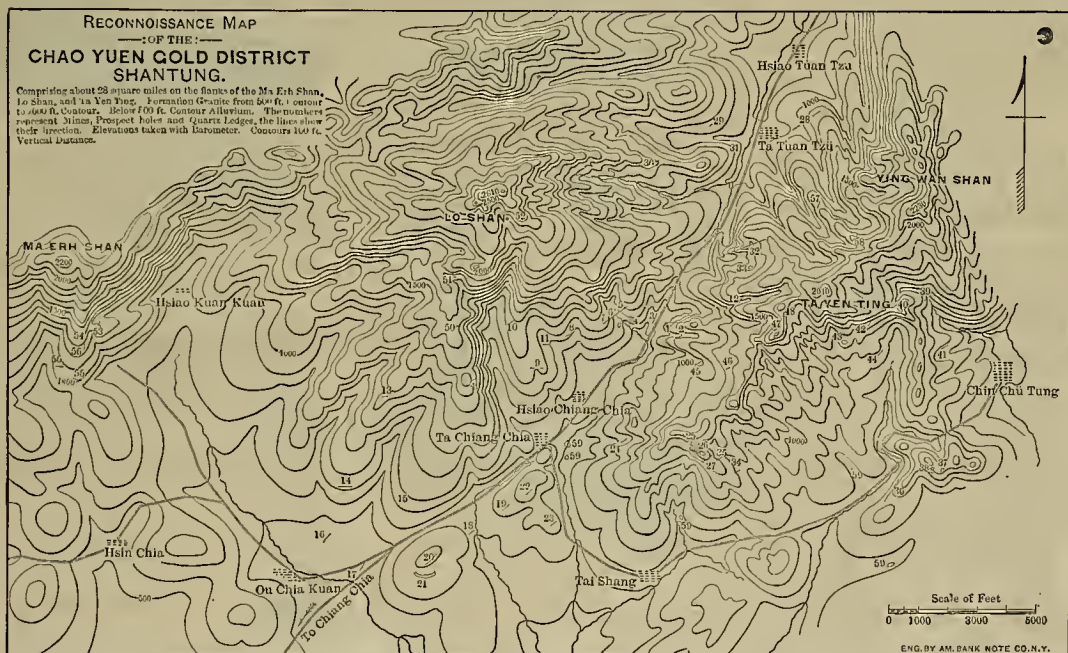
Sulphurets.

As a general proposition, the presence of much of a percentage of sulphurets in gold-bearing ore is a nuisance, entailing the expense of concentrating machinery and a subsequent chlorination process to get the whole value. The mills are nearly all equipped with concentrators to save the sulphurets. Many processes have been devised to work the sulphurets with the free ore at the same time, to save two treatments. The success of the MacArthur Forrest system in this direction is what is causing so much interest in this "cyanide process."

A man has lately been about this State to find "sulphuret mines," and strange to say, he does not find more than one or two with ore which contains enough sulphurets for his purpose. He wants it to have 30, 40 or 50 per cent sulphurets. These need not be worth more than \$15 or \$20 a ton, but the percentage of sulphurets must be high.

So the "glittering ore" for once is in demand. Any miners who own this class of mines may send word about them to the editor of this paper, and he will refer the letters to the proper parties. Do not be afraid if the stuff is all sulphurets; so much the better.

We have been reading and hearing for years of mines with ore so highly sulphuretted that no one could do anything with it. Now is the time for such mines to come to the front. Owners of sulphuret mines have had white elephants on their hands, and it may surprise them to find anybody who wants to hear about the ore or claims. But there are men prepared to work such ore, provided 40 or 50 tons a day can be obtained from a mine or group of mines.



- 1 Ling Lung Shan, Tunnel.
- 2 Ling Lung Shan, Old Work.
- 3 To Chien Kow, Shaft.
- 4 Chien Hsien Ting.
- 5 Hung Chin, Open Cut.
- 6 Hung Chin, Nao Pang.
- 7 Yü Tzu Tien.
- 8 Chien Wan Po Pel.
- 9 Hei Shih Yeh Ting.
- 10 Ma Ting.
- 11 Ching Wan Tzu Pel Ting.
- 12 Chü Chia Chien.
- 13 Hung Chia Pel.
- 14 Ta Ma Chien.
- 15 Lao Hsi Kow Ting.
- 16 Lao Hsi Kow.
- 17 Tu Ti Miao.
- 18 Pai Shih Shan.
- 19 Chia Shan.
- 20 Pai Shih Shan Ting.
- 21 Large Outcrop White.
- 22 Nan Chang Pel, (Quartz).
- 23 Chu To Wan.
- 24 Pan Chia Yen.
- 25 Tai Shang Pel Pien.
- 26 Old Workings.
- 27 Tuan Tung Tai.
- 28 Yü Hsi Kuang.
- 29 Niu Liang Kuang.
- 30 Mao Yü Ting.
- 31 Shou Yen Po.
- 32 Tiao Tai Kuang.
- 33 Tiao Tai Kuang, Nan Pang.
- 34 Chang Chang Yang.
- 35 Sel Ting Ho.
- 36 San Tung Hoo.
- 37 Po Ton Ching.
- 38 Po Ton Ching, Hsi Pang.
- 39 Hui Shih Pen.
- 40 Sa Hung Chien.
- 41 Shih Kuo, Nan Kou.
- 42 Tung Chang.
- 43 Chün Yen.
- 44 Tung Ka Tzu.
- 45 Ta Chien.
- 46 Ta Chien, Old Work.
- 47 Ling Lung Ting.
- 48 Hu Chien, Hsi Ting.
- 49 Dark Granite Dyke.
- 50 Shih Wa Kou, Hsi Ting.
- 51 Pan Hsien Tung, Temple.
- 52 Lo Shan Hoo.
- 53 Ta Ma Chien, Po Pel.
- 54 Ta Ma Chien, Hsi Ting.
- 55 Hsien Tung.
- 56 Hsi Nan Ting.
- 57 Yo Nan Hsien.
- 58 Chien Hsien Pel.
- 59 Gold Washings.

ton. A continuation of this ledge on the west side of the ravine, known as Yu-Tzu-Tien, shows about the same characteristics and an assay value of \$4.43 per ton. Between these two openings is a vein, differing from the first ledge slightly in its course, materially in its dip, and decidedly in the character of its ore. It consists of about 18 inches of massive white pyrites, with a little quartz assaying \$8.10, and below this a tal-

west, and have a perpendicular dip. One assay gave \$15.17 per ton.

The average of 19 gold-ore samples taken from prospect holes of this district is \$5.86; and the average of ten samples, containing over \$2.50, is \$9.79, or nearly half an ounce to the ton. This is well within the working-limit, as the other surroundings are favorable. The location has sufficient water; an abundant and cheap fuel-supply is assured

Yuen region one of the most promising he has visited in China.

About 100 miles northwest of Peking, and 80 miles from the coast, is the Mongolian mining region indicated on the map printed last week as a shaded square. It comprises several distinct districts, which are shown more in detail on Mr. Clark's route map given herewith. These districts will be briefly described in the Press.

Irrigation Canals and Irrigation Works.

One of the most complete scientific treatises ever published in this State is that of P. J. Flynn, C. E., on "Irrigation Canals and Other Irrigation Works," and "The Flow of Water in Irrigation Canals," printed by George Spaulding & Co. of this city. It is a book for engineers engaged on works of irrigation, water supply, sewerage, land drainage, river improvement, etc. The work is divided into two parts, is illustrated and abounds in well arranged tables. By the use of the tables, any problem relating to open or closed channels, likely to arise in practice, can be rapidly solved. A great saving of time and labor can be gained by the use of the tables. There are 37 examples relating to open and closed channels, which will be of especial use to the student.

Tables 30, 31 and 32 give the velocity and discharge of a large range of open channels, and tables 68 and 69 give the velocity and discharge of circular and egg-shaped pipes, sewers and conduits.

At pages 8, 195, etc., is given the most complete collection of formulæ, old and modern, 69 in number; that has ever before been published, in a single work, in the English language.

The "Flow of Water" will be useful, not only to the irrigation engineer, but also to the engineer engaged on water supply, sewerage, drainage of land and improvement of rivers, etc.

The tables of contents of volumes 1 and 2, and the index of volume 1, are very full, and will enable the reader to find any subject referred to in the book, without loss of time.

Mr. Flynn is acknowledged to be one of the most accomplished mathematicians on this coast, and has had great practical experience in this country and abroad on irrigation and other engineering works. He is therefore perfectly competent to write authoritatively on this subject, and has evidently devoted great labor to his work. The typographical appearance of the book is exceptionally fine. Good ink has been used on heavy paper, and the table work skillfully done. The two volumes are bound in one book; price \$8, post free. The work contains 711 pages and 211 illustrations. This branch of engineering science, of such great importance to California and the Pacific coast, has been neglected by our writers until now. While Mr. Flynn has given much of what has heretofore been known, he has also added much that is original and of great value. Professional men will appreciate the labor bestowed on this book, especially on the table work.

About Gold Rock.

PRESCOTT, A. T., May 28.

TO THE EDITOR:—Will you please answer the following questions on gold rock for my information and that of others?

1. Is chromic iron present in iron pyrites where gold is present in the same?
2. Is chromic iron present in brown oxide and red oxides of iron that are found in veins of gold ore?
3. What are the general classes of iron which are found in gold ore?
4. Will a solution of iodine and iodide of potassa dissolve the black oxide, red oxide and brown oxide of iron?
5. Is the oxygen driven out of the oxides of iron by the solution of iodine?

Yours, J. W.

The following are the answers to the above questions:

1. No.
2. No. It may, however, be found as an accidental admixture.
3. Sulphurets and oxides.
4. No.
5. No.

VEINS IN AGRICULTURAL LAND.—J. R. Treloan has received a dispatch stating that the Supreme Court of the United States has reversed the decision of the lower court in the case of South Spring Hill mine vs. Median Mining Co. The lower court held that a mining company had no right to follow their vein into agricultural ground patented before the mine was located. The Supreme Court settles the point in favor of the mineral claimant.—Amador Ledger.

Cement Mortars.

In a recent article in the *Revue de Genie Militaire*, M. R. Feret remarks that in making cement mortar the sand is usually measured while the cement is weighed. This plan has many advantages in practice, as the cement is received in bags or barrels ready weighed, while it would be difficult to weigh the sand. Nevertheless, the amount of sand determined in this way is somewhat variable, as it will be more if measured in a small number of large measures than in a greater number of smaller ones. Moreover, the quantity contained in a given measure varies with the dampness of the sand. If but slightly damp, the amount of sand in a measure will be decreased, as much as 20 per cent in cases, when compared with the same sand measured dry. If, however, the sand is still further wetted, the reverse takes place, and the measure even contains still more sand than if measured dry, as the water brings about a compacting of the particles. The voids in a mass of sand vary with the regularity of the sizes of the grains. Were these perfectly uniform, the voids in a mass of coarse sand would be of exactly the same volume as in a similar mass of fine sand; but as in practice the grains never are uniform, each particular sand has a certain percentage of voids peculiar to itself, which one cannot do more than fill, no matter how large a proportion of cement is added in making the mortar. From the fact that natural sands are uniform, it follows that the many researches on the influence of the size of grain on the strength of a mortar have little practical bearing, as in such experiments the size of the grains is carefully calibrated by only using such as pass through one particular mesh and are arrested by a second finer mesh. The grains are thus rendered uniform in size and no longer correspond to natural sands. To further investigate the subject, M. Feret has prepared artificial sands out of crushed quartzite. The sand as received from the crusher was graded into three degrees of fineness. The first consisted of such grains as would pass through a sieve containing four meshes to the square centimeter, and were retained on a sieve of 36 meshes per square centimeter. The second consisted of grains passing through a sieve of 36 meshes per square centimeter and retained in one of a much finer mesh, while the third consisted of the grains passing this last sieve. Measured dry, each of these samples had practically the same specific weight, No. 2 being slightly the lightest. Mixed in various proportions, it was found the mixture having the highest specific weight was one consisting of six parts of the first sand and four of the third. This weighed 1686 kg. per cubic meter, or 30 per cent more than No. 2.

A Pump for Small Mines.

A novel and ingenious method of pumping water from mines has been invented by a resident of Walkerville, Mr. P. H. Hohmann. Mr. Hohmann is of an inventive turn of mind and sometime ago he patented a neat device which is now in operation near the terminus of the cable car line. This arrangement consists of a sliding lever by which the grip passes over the guide pulleys.

The pumping apparatus is known as a horse power whim pump. To an ordinary horse whim is attached a shaft connected to a disk wheel in the mine shaft. The apparatus at the bottom of the shaft consists of two cylinders connected on the under side with the suction pipe and on top with the discharge pipe. These cylinders contain two plungers connected by the piston with two walking beams. The upper walking beam connects with the disk wheel. The pump is worked on the same principle as a Cornish pump. The disk wheel connects with the shafting of the whim, and the rotary motion is derived by connecting gears. The disk wheel shaft and the whim shaft are connected at right angles by bevel gears. Each revolution of the whim causes the disk to rotate six times.

The disk works the walking beams and they in turn by a triangular motion work the plungers of the cylinders. These walking beams are light pieces of flat iron and are connected to each other by means of chains or wire rope.

This device will be of the greatest service to prospectors who are developing small properties. Every mining man is aware of the fact that the handling of water in mines is more expensive than the actual work of extracting the ore. The greatest feature of this apparatus is that no costly steam boilers or pumps are required. A one-horse whim will operate a mine 200 feet

in depth and will pump fifty gallons of water per minute.

One of these whim pumps is now in practical operation at the Blackstone mine, north of Walkerville. The device is owned by Col. Wilson and Mr. Hohmann, and will be placed on the market as soon as satisfactory arrangements can be made with some manufacturing concern.—*Butte Inter-Mountain*.

Curious Actinic Phenomena.

It has been shown by M. Rayet (Academy of Science, Paris) that the moon can be photographed when fully eclipsed, that is when it is entirely plunged in the shadow of the earth. This curious fact is explained by supposing that the surface of our satellite retains a certain amount of actinic power after it is withdrawn from the rays of the sun, or that some solar rays reach the lunar surface during a total eclipse by refraction. Many substances do retain actinic power after they are withdrawn from light, and M. A. Gautier has recently shown that a mixture in equal volumes of chlorine and hydrogen will explode in 20 or 30 seconds when placed in the shade at a spot which the sun has recently lighted up. Several curious phenomena of the same description have been described in Phipson's "Phosphorescence," in 1862, where it is shown that paper impregnated with tartaric acid and exposed to sunlight, will act upon photographic paper in the dark, etc. It is a curious fact that chlorine and hydrogen, which have been obtained by the electrolysis of hydrochloric acid, will explode together in diffuse daylight, which only affects the two gases obtained by the ordinary laboratory methods very slowly. M. Gautier has called attention to another singular fact. If hydrogen gas is mixed with chlorine gas which has previously been exposed to sunlight, the mixture will explode instantaneously in the dark. This phenomenon was observed long ago by the late Dr. Draper of the United States. It is evident from these observations that substances which have been submitted to the action of electricity, or which have been exposed for a certain time to the direct rays of the sun, are in a peculiar state of excitement, which renders them much more active as regards one another than are the same substances prepared by the ordinary methods of the laboratory. Under these circumstances they acquire a peculiar allotrophic state, similar to what ozone is as regards ordinary oxygen gas. The surface of the moon, when totally eclipsed, is not absolutely invisible to the eye, and it radiates sufficient actinic light to enable a photograph to be obtained in a short time on the modern sensitive plates.

ENRICHING COAL GAS.—At a recent meeting of the Scottish Gas Managers, Mr. T. Douglas Hall, in the opening address, referred to oil gas as follows: "It is affirmed that if you pass oil gas through a heated retort, and then allow it to mix with the coal gas as it is being generated, a permanent gas is obtained; and also that the finer the spray of oil that is formed the better are the results, the oil being so much easier decomposed. Compressing, therefore, to a high degree, would, in these circumstances, be of great advantage. Hitherto the success with oil as an enricher has been varied, but as the process is new, comparatively speaking, let us hope it is capable of great development. That the manufacture of oil gas is a success we see every day in railway carriages and gas-lit buoys. A process for making a very rich gas is at present being put forward by a Manchester company calling itself the Hydro-oxy Gas Company, and it is claimed that this gas can be used for enriching ordinary coal gas."

MIXING ARTIFICIAL WITH NATURAL GAS.—The Michigan Gas Company, of Detroit, Mich., will soon begin the manufacture of fuel gas. The company proposes to make use of artificial gas in supplying its customers with fuel. It will be supplied in the proportion of 1000 artificial to 2000 parts of natural gas. This, of course, will greatly reduce the drain on the natural gas wells. The capacity of the new manufacturing plant to be put up by the company will be 2,000,000, with a reserve of 4,000,000 if needed. The most modern appliances will be used, and the gas may be produced at a much cheaper rate than at the present time. Am. Manufacturer.

CAMPBOR GUM.—Complaint is made at the present high price of campbor gum. While a few years ago the gum sold for 19 to 25 cents a pound, it now sells for from 55 to 75 cents. This rise in price is due to the use of campbor gum in the manufacture of smokeless powder both in Europe and America.

MOTIVE POWER **HERCULES**
Gas and Gasoline
ENGINES
Have fewer parts, and are therefore less likely to get out of order than any other gas or gasoline engines now built. Just light the burner, turn the wheel, and it runs all day.

MAKES NO SMOELL OR DIRT.

No double or false explosions, so frequent with the unreliable spark,

For Simplicity It Beats the World.

It Oils itself Automatically.

No Batteries or Electric Spark.

It runs with a Cheaper Grade of Gasoline than any other Engine.

FOR DESCRIPTIVE CIRCULARS APPLY TO

PALMER & REY, MANUFACTURERS,
San Francisco, Cal. and Portland, Or.

COLUMBIA, CAL., Dec. 15, 1891.

Messrs. PALMER & REY, San Francisco, Cal.
DEAR SIR: Yours of the 9th to hand. In reply will state that the one-horse power Gasoline Engine I got from you has been running every day, for the past three weeks, and has given entire satisfaction. It is placed in a tunnel full 300 feet from the surface, and is hoisting ore from 100 feet below that. It does all you claimed for it, and is the best and cheapest power that has been in or about a mine. A number of mining men in this locality have viewed the machine in operation, and they all pronounce it a perfect success.
Yours truly, F. L. McPHERSON.

ROOM WITH POWER
TO LET

BY THE

PACIFIC POWER COMPANY.

Well lighted large rooms to let with Power for manufacturing purposes, or without Power for business purposes, in very convenient location—Stevenson St., near First. Elevator and freight hoist.

APPLY TO

SUPERINTENDENT'S OFFICE

11 STEVENSON STREET.

GREAT REDUCTION!

BATTERY SCREENS.

Best and Cheapest in America.



PERFORATED SHEET METAL

For Flour and Rice Mills, Grain Separators, Revolving and Shot Screens, Stamp Batteries and all kinds of Mining and Milling Machinery. Iron, Steel, Copper, Brass, Zinc and other metals punched for all uses.

Inventor and Manufacturer of the celebrated Slot Cut or burred and Slot Punched Screens.

Mining Screens a specialty, from No. 1 to 16 (fine).

Orders promptly attended to.

San Francisco Pioneer Screen Works,
221 & 223 First St., San Francisco, Cal.
JOHN W. QUICK, Proprietor.

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CHICAGO, ILL.

Will be pleased to submit designs of Improved Appliances for the

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—OF—

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Gravel, &c., &c.

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Ores, Mining, and Commission,

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Ships under advances to smelting works in Boston New York, Baltimore and Liverpool.

Twenty-five years' experience in Shipping Ores and Managing Mines.

Solicits Consignments of Copper Produce and Management of Mining Matters.

All business conducted on Cash Basis.

Purchase and shipment of Mining Supplies a SPECIALTY.

Sales of Developed Copper Mines undertaken.

Business Manager of UNION COPPER MINE, Copperopolis, Cal.; NEWTON COPPER MINE, Amador Co., Cal.

INVENTORS, TAKE NOTICE!

L. PETERSON, MODEL MAKER,

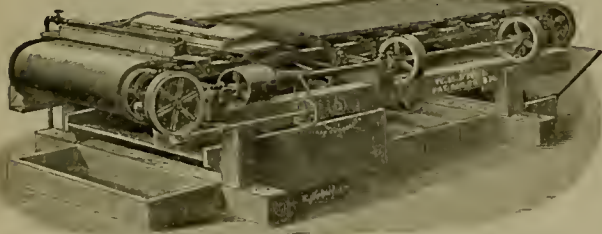
226 Market St., N. E. cor. Front (upstairs), San Francisco

Experimental machinery and all kinds of models, tin and brasswork. All communications strictly confidential.

FRUE ORE CONCENTRATOR

OVER 3200 IN ACTUAL USE.

Manufactured under Patents of April 27, 1880; September 18, 1883; July 24, 1888; and March 31, 1891.



Price of 4-foot wide Plain Belt Frue Vanner..... \$550, f. o. b.
 " " " Improved Belt Frue Vanner 800, f. o. b.
 " 6-foot " Plain Belt Frue Vanner..... 800, f. o. b.

CLADSTONE MINING COMPANY, C. J. Clark, M. E. Genl. Sup't. MESSRS. ADAMS & CARTER, San Francisco, Cal.—DEAR SIR: During my experience in mining and milling, I have used twenty-four of your four-foot Frue Vanners on different kinds of ore, both gold and silver. I have made competitive tests against them with other widely puffed-up concentrators and have always found the Frue in first place. When I built this mill (20 stamps), I determined to put in six-foot Frues in order to save space and machinery. I am now running four of your six-foot machines and they have been going for TWELVE MONTHS. They are taking the pulp from 20 stamps, crushing a minimum of fifty tons per day, and do better work than the four-foot tables. They require no more attention than a four-foot table and handle at least twice the quantity of ore. I have run them up to 80 tons per day and could not see that they were crowded. They stop and start as easily as the smaller tables and have the advantage of double capacity with the same bearings and wearing parts, require no more oil, and no more wear and tear than the smaller tables. My repair account for the past six months has been too small to mention. In order to give an idea of the work they are doing here I will state that the ore has varied monthly from \$5 to \$20 per ton and the tailings from nothing to 60 cts. per ton. I will conclude by saying that I cannot endorse the six-foot Frue Vanner too highly, and it is the only table that I would have to my mill.
 C. J. CLARK, Gen'l Sup't.

For any information, or for pamphlets, or for circulars or testimonials, call on or address us at our office.

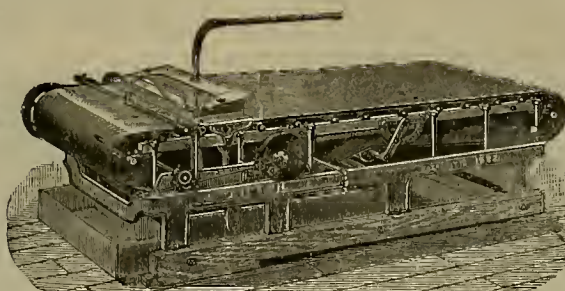
ADAMS & CARTER, Agents FRUE VANNING MACHINE CO.,
 No. 132 Market Street, San Francisco, Cal.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
 Price "Triumph" Concentrators, with Plain Belt - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin it need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
 39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company, Principal Office, 401 California St., cor. Sansome, S. F. Location of Works, Grass Valley, Nevada Co., Cal. GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.

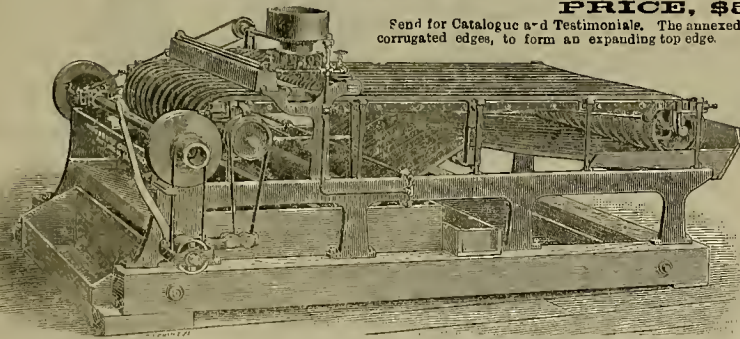
Signed) Sup't North Star and Original Empire Mining Co. N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

THE WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS

Was awarded the Highest (Bronze Medal) Premium at Mechanics' Institute, 1890 and 1891. MORE THAN DOUBLE THE CAPACITY with one-half less power and occupying less than one-half the space of any other concentrator. Built of Best Steel and Wrought Iron. Strong and Durable.

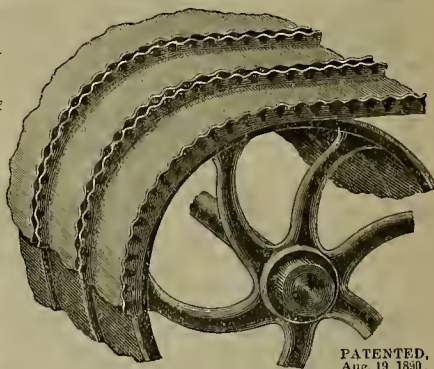
PRICE, \$675, f. o. b.

Send for Catalogue and Testimonials. The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge.



THE SAN JACINTO ESTATE—Office of the General Manager, CAJALCO, Oct. 30, 1891. GEO. E. WOODBURY, Esq.—Dear Sir: In reply to yours of the 27th inst., respecting the working and efficiency of the "Woodbury" Concentrator placed in our works by you, I am pleased to inform you that it is giving entire satisfaction; it has a much greater capacity than any other machine, and is doing fully one-third more work, with the concentrates equally clean, as from either of the machines it work here. (Copy) Yours faithfully, S. HARRIS, Manager. THE SAN JACINTO ESTATE, LINDSEY—Office of General Representative, P. O. address, South Riverside, San Bernardino County. CAJALCO, February 17th, 1892. GEO. E. WOODBURY—Your letter of inquiry about your concentrator came to hand in due course. Your machine is doing well, the motion is all right, and the machine is giving entire satisfaction. Yours faithfully, S. HARRIS.

GEO. E. WOODBURY, Man'fr, 213 to 219 First St., San Francisco.



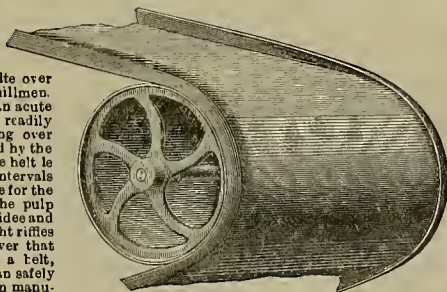
PATENTED, Aug. 19, 1890.

THE BLASDEL CONCENTRATING BELT COMPANY.

We have now made arrangements to have our new Improved Concentrating Belt manufactured in San Francisco. We keep always on hand Belts suitable for the Triumph and Frue machines, but can make any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen.

First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of two to four feet, have a very slight riffled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight riffles also save very fine sulphurets and the quicksilver that could otherwise escape with the tailings from a belt, the surface of which is entirely smooth. We can safely say that it is a better belt than has ever been manufactured for use on this coast. It will last much longer and will handle fully one-third more pulp than any smooth belt, and will save a higher percentage of sulphurets.

H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.



ATLAS IRON WORKS,

POTRERO, SAN FRANCISCO, CAL.,

BUILDERS OF

Mill, Mining, Street Railway

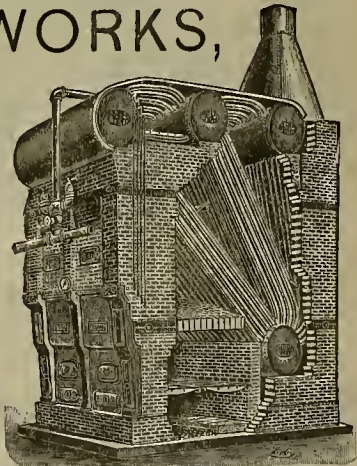
AND

Dredging Machinery,

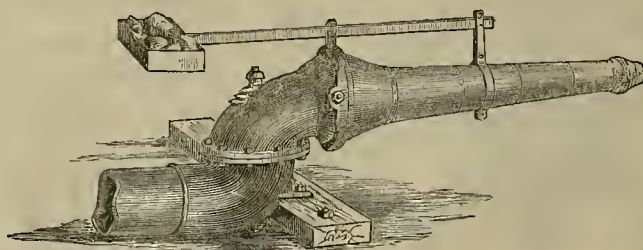
PACIFIC COAST AGENTS FOR THE

Sterling Water Tube Safety Boiler,

Safest, Most Economical and Durable Boiler in the Market. Specially Adapted to Mining Purposes—Being Easily Transported over Mountain Roads.



IMPROVED FORM OF HYDRAULIC GIANTS.



THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture, and which are pronounced far superior to the SINGLE-JOINTED style. The latter, however, we furnish when requested. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent upon application.

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IRON
PIPE



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ALL SIZES, FOR GAS, STEAM AND WATER.
— WE MANUFACTURE —

SHEET IRON AND STEEL PIPE,
ALL SIZES.

For Water Supply, Mining, Irrigating Purposes, Stock
Ranches, Etc.

Made in Lengths Desired from 16 to 30 feet.

The Cut shows a Section of Three Joints

DOUBLE RIVETED SHEET IRON PIPE.

In the manufacture of this Pipe, we use only a high grade of annealed
Charcoal iron of great tensile strength.
The weight or thickness of metal used, is graded according to service
required, and pressure to which the Pipe will be subjected.

FOR ALL UNDERGROUND PURPOSES, we immerse the Pipe
in a bath containing a special mixture of ASPHALTUM, BITUM and
PETROLEUM, at a Temperature of 300° Fahrenheit. It thus
receives a thorough coating, both inside and outside, rendering it impervious
to the alkalis of the earth, rust, etc., and is practically indestructible.



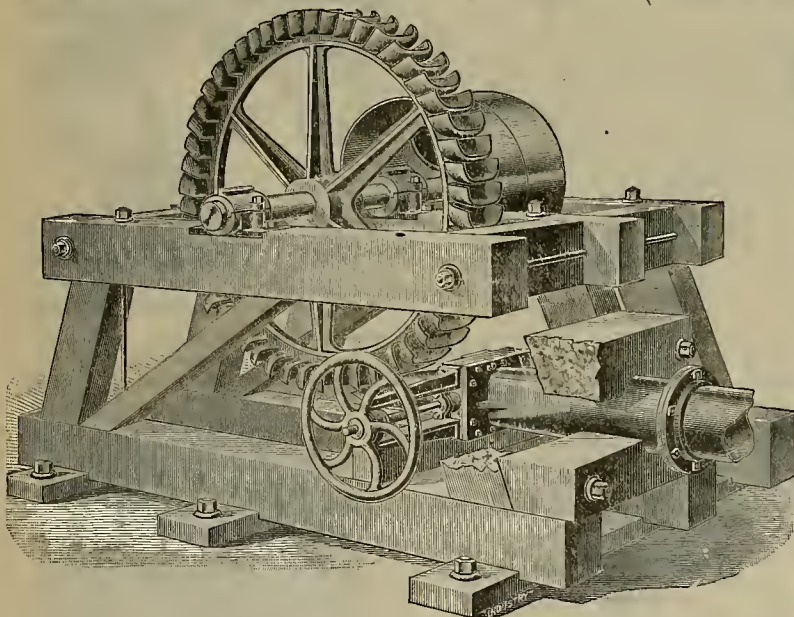
CORRUGATED IRON,

Black, Painted and Galvanized, for Roof and Sides of

HAY BARNs, DRY HOUSES, STABLES, ETC.

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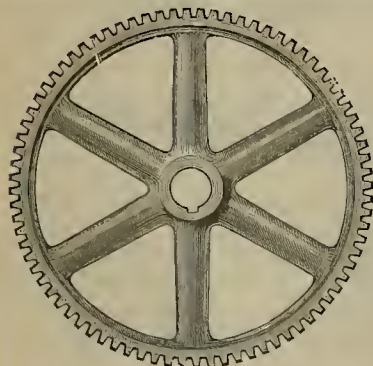
KNIGHT WATER WHEEL

For Running Mills, Hoisting Works and Electric Machinery.

KNIGHT & CO., FOUNDRY AND MACHINE SHOP,

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Patent Models

And Experimental Machinery of All Kinds.

Shafting, Pulleys and Boxes,

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DRAWINGS, PLANS and SPECIFICATIONS made for
new machinery.
Jobbing of every description promptly attended to.
FINE WORKMANSHIP GUARANTEED.

WIRE ROPE

FOR ALL PURPOSES.

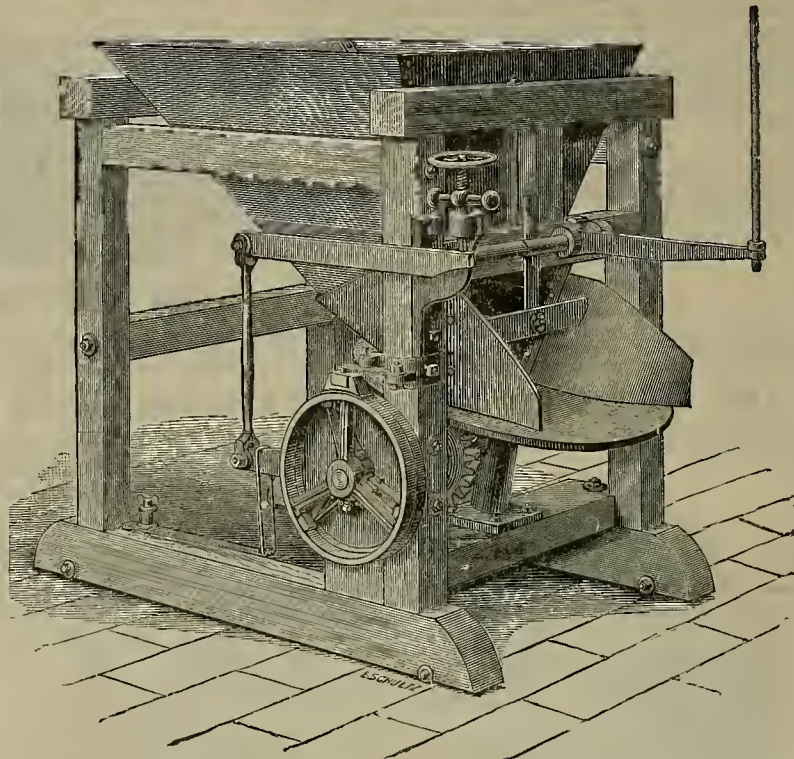
IRON AND STEEL WIRE OF ALL KINDS

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Nos. 39 to 51 FREMONT STREET, SAN FRANCISCO, CAL.



"HENDY" IMPROVED "CHALLENGE" ORE FEEDER.

THE BEST FORM OF FEEDER EVER DEVISED,

And pronounced by reputable mining men to be far superior to any other, as the fact that over 3000 have been
placed in successful operation fully demonstrates.

WE ARE ALSO MANUFACTURERS OF THE

"STANFORD," "TULLOCK" AND "ROLLER" FEEDERS,

And will furnish descriptive Catalogues and quote prices upon application.



KEYSTONE BOILER WORKS

HAMILTON & LEACH,

Main and Folsom Sts.,
SAN FRANCISCO, - CALIFORNIA.

ESTABLISHED 1866.

Pacific Chemical Works.

HENRY G. HANKS,

Practical and Industrial Chemist, Assayer
and Geologist.

718 MONTGOMERY ST., - SAN FRANCISCO.

Will report on the condition and value of any mining property on
the Pacific Coast. Rare Chemicals made to order. Instructions given in
Assaying and Practical Chemistry.



An Anti-Mining Convention.

A mass meeting was held at Colusa on Saturday, by farmers and citizens, and resolutions were adopted protesting against the passage by Congress of the hydraulic mining bill. The resolutions declare that the position of the farmers and other citizens of the valley on the subject of hydraulic mining by means of the system of impounding dams, has been misrepresented at Washington and elsewhere, and that the farmers have never admitted in any shape that they were willing to make concessions, but that they have stood and still stand squarely upon the decisions of Judge Temple of the State court and Judge Sawyer of the United States Circuit Court. The resolutions say: "It has been held after years of experience, that hydraulic mining is destructive of our rivers and the Sacramento valley; that if said form of mining is to continue, the navigation of the rivers and farming in the valley must be abandoned; and that there is no compromise on impounding dams, for that method has been persistently rejected by the inhabitants of the valley."

A convention of citizens of Tehama, Butte, Glenn, Colusa, Sutter, Yuba, Yolo, Sacramento, Solano and San Joaquin counties has been called by this mass meeting, to be held in Sacramento on June 10th, to consider the questions which are involved in the Colusa resolutions.

As the bill in Congress authorizing the building of dams to restrain the debris is on the eve of passage, it was to be expected that some opposition would be manifested on the well-known California principle of not letting any other Californian get anything if it can be helped. The miners do not ask to be permitted to work unless they can do it without injury to other interests; any other idea has long since been given up.

The farmers know nothing whatever about impounding dams. That is a matter out of their line altogether. The Government engineers have decided in favor of the dams, and their opinion is of more moment. The farmers might at least let the plans be tried, and give the miners a chance to make a living. But it is too much to expect that this question should be settled without more controversy; so we must again see two industrial classes arrayed against each other.

The Fulton Iron Works Fire.

On Sunday morning last the principal part of the block bounded by Howard, Folsom, Fremont and Beale streets was destroyed by fire. The heaviest losers are Hinckley, Spiers & Hayes of the Fulton Iron Works, whose entire plant was destroyed—the second time they have so suffered within five years. The California Car Works of John Hammond & Sons were also burned, as were Greenberg & Sons' Brass Works and Drake's machine shop. The fire at the Fulton, in 1887, was confined to the machine shops, but this time the whole works are wrecked. All the tools are ruined, and many valuable drawings, etc., destroyed. The insurance does not come anywhere near covering the loss, which is estimated at \$300,000 for the Fulton alone.

The buildings destroyed were within the fire limits, and if rebuilt wood cannot be used. It is not probable, therefore, that the same location will be used. There is some talk of the Fulton taking the old Pacific buildings now occupied by the branch Union Works. The firm has not yet decided on its future course. These works were the third largest in the city, ranking next the Risdon. Every one regrets the misfortune which has overtaken this firm, which is a very popular one, and the hope is generally expressed that operations will be resumed at once.

ENCOURAGING reports come from the oil fields in all parts of Southern California. Both Kern and Humboldt counties also are doing well with oil.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 24, 1892.

- 475,375.—MICK PAIL AND STRAINER—F. & G. W. Ausley, Medical Lake, Wash.
475,655.—CRUPPER STRAP FASTENER—F. L. Armas, Pescadero, Cal.
475,377.—SOLE IRONING TOOL—Atwood & Orcutt, San Francisco.
475,433.—BRICK KILN—M. A. T. Boehucke, Centinela, Cal.
475,485.—CLAY REDUCER—W. Buckman, San Francisco.
475,497.—FRUIT GRADER—J. A. & C. F. Fleming, San Jose, Cal.
475,317.—MUSIC LEAF TURNER—C. H. Huff, Tropico, Cal.
475,451.—WAVE POWER—R. L. Johansen, Los Angeles, Cal.
475,454.—COATED METAL PIPE—W. Lacy, Jr., Los Angeles, Cal.
475,406.—HOSE COUPLING—J. E. Louthian, Etiwanda, Cal.
475,706.—CAR COUPLING—S. Q. Sanders, New Bridge, Or.
475,743.—COIN CONTROLLED APPARATUS—G. F. W. Schultze, San Francisco.
475,360.—AMALGAMATOR—J. M. Thompson, San Francisco.
475,641.—VOTING BOOTH—I. D. Vandecar, Stockton, Cal.

The following brief list by telegraph, for June 2, will appear more complete on receipt of mail advices:

- San Francisco—Mark Anthony, Berkeley, means for protecting bungee of barrels; Edgar B. Badlam, carburetor; James W. Kinsman, hoisting apparatus; John Hummers, horse hoot.
California—John A. Bliz, Pleasanton, two-wheeled vehicle; Walter L. Frazier and Walter E. Brown, National City, adjustable spindle nut; Michael N. Laufenberg, Stockton, finger bar; Isaac W. Lord, Cucamonga, indicating funnel; Thomas A. McGovern, Bolinas, oil gauge for lamps; Dennis W. McLaughlin, San Leandro, combined weighing and advertising device; David M. Miller, Fairfield, car axle; Frank White, Pomona, snap hook; Daniel T. Woodman, Blackburg, horse-controlling device.
Oregon—Gustaf E. Hadlund, Portland, boot or shoe.
Washington—Patrick Curran Hoquiam, swimming equipment; James W. Fisher, Palouse, water supply system; Legrande D. Harding, Colfax, grinding mill; Raymond L. Palmer, Tacoma, safety lock for hammerless guns.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors, transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

OPERA CHAIR.—John T. McKean, Santa Rosa, Cal. No. 475,019. Dated May 17, 1892. The object of this invention is to provide an opera chair, the seat and back of which may be folded into a parallel vertical position when not in use, and the seat-supporting standard is automatically rotatable about its socket in the base or floor, so that when the seat and back are thus folded together and vacated, the whole device will immediately turn a quarter revolution, thus forming passages between the seats from front to rear, as well as transversely, which greatly aids the occupants in vacating the house after the performance. The seat standard may fit a socket plate in the floor and be made easily removable, so that if it is desired to clear the floor of the house for any purpose, the seats can all be easily taken out.

COMBINED CARD LEDGER AND INDEX.—John A. Langstroth, San Francisco. No. 475,043. Dated May 17, 1892. The invention is designed to provide a simple and expeditious means for keeping accounts and indexing them, so that they can be rapidly found and examined, and closed accounts may be removed, and new accounts continually inserted, at the same time retaining a proper alphabetical arrangement of those accounts, while saving the time and labor usually expended upon the keeping of an index. Where an ordinary ledger is made, with a large number of accounts, these accounts are written in the ledger from time to time as they occur, and an alphabetical index (upon which all the account names, as well as ledger and folio have to be entered) is necessary in connection with such ledger. Much time is lost in examining the index to find the accounts, and in turning over pages of the ledger for any work that is necessary to be done upon the open accounts, by reason of the ever increasing number of closed accounts. This invention is designed to save the labor of indexing and the time and labor of handling and inspecting the closed accounts, all the time and labor spent in opening new or transfer ledgers for old accounts, and the time usually spent in referring to an index by the ordinary method. The accounts are kept on a series of separate and independent cards, in perfect alphabetical order, with guide cards of the same size interposed between them in such a manner that they serve as index cards and also adjustable supporting partitions.

SEPARATOR.—F. H. Wheelan, Santa Barbara. No. 474,930. Dated May 17, 1892. The general object of this invention is to provide for the separation of material particles composed of different sizes. The particular object is to separate the particles of dirt or imperfect specimens from grains and seeds having greater length and breadth than thickness, such, for example, as Lima beans. It consists in a mode or method of separating materials composed of

particles of different sizes, by carrying the material upon a suitable moving surface toward a succession of graduated openings, and drawing them up and upon said surface, through said openings, as their sizes will permit. It also consists in a mode or method of separating materials of different sizes having a greater length and breadth than thickness, by carrying the material upon a suitable moving surface toward a succession of graduated openings, and presenting the particles edgewise to said openings and drawing them up and upon said surface, through said openings, as their different thicknesses will permit. The machine also finally keeps separate the different sized particles which pass through the graduated openings.

DESIGN FOR AN ENGINE FRAME.—Daniel Best, San Leandro, Cal. No. 21,545. Dated May 17, 1892. This invention consists of a novel design especially adapted for a frame and bed-piece of gas engine. The leading feature of the design is the peculiar outline of the frame upon which the cylinder rests, the two merging into each other, the frame having a peculiar trough shape, extending from the cylinder to the end where the crank shaft has its support, together with downward projecting legs or supports at each end and an arched under-body.

FRUIT PITTING MACHINE.—Frank C. Staniford, Gilroy, Cal., assignor of one-half to D. C. Riddell, Santa Cruz, Cal. No. 475,048. Dated May 17, 1892. This is an improvement devised for removing the pits from peaches, apricots and similar fruit. It consists of a table, with guides, and overlapping knives, and mechanism by which said knives are caused to reciprocate to and from each other, and the fruit-splitting table situated beneath and between the meeting ends of the knives; said table being depressible to bring the fruit into line with the knives; and automatically returned by a spring when released. It is well known that in order to make a merchantable article, all such fruit as peaches, apricots, etc., must be split in the direction of the major axis, the longer diameter of the fruit and the stone, and no automatic means have been devised by which the fruit can be accurately placed in this position without other assistance. By this device the operator can readily place each fruit beneath the knives, and a basket of fruit can thus be pitted in five or six minutes, the fruit being turned out in good merchantable condition.

VOTING BOOTH.—Israel D. Vandecar, Stockton. No. 475,641. Dated May 24, 1892. Under the plan known as the Australian ballot system, which has been adopted in many of the States of the Union, it is requisite that the voter have a booth or compartment to which he may retire for the purpose of preparing his ballot in secrecy. The object of this invention is to provide such booths in a form which will render them easily portable in the smallest possible space and readily set up at the points where they are to be used. This is important, because in thinly settled districts it is often necessary to carry the paraphernalia for election purposes to distant precincts, often over rough roads, and in any event, it is desirable to have the apparatus safely stored and packed away when not in use.

CLAY REDUCER.—Walfrid Burkman, S. F. No. 475,483. Dated May 24, 1892. The invention relates to the general class of machines for reducing and disintegrating clay, feldspar and other similar materials in a dry or semidry condition. The object is to provide a complete and efficient machine adapted to receive the material in the crude shape and deliver it in any condition of fineness required, combining in its operation that of crusher and reducer, the material passing through it constantly and automatically, and having a storage sufficient to keep it steadily working while new supplies are being brought.

FRUIT GRADER.—Geo. A. and Chas. F. Fleming, San Jose. No. 475,497. Dated May 24, 1892. This is a machine for grading fruit and other materials composed of particles or pieces of different sizes. The object of the invention is to provide a grader of great capacity, simple in operation and accurate and effective in results.

CRUPPER STRAP FASTENER.—Fabricio L. Armas, Pescadero. No. 475,655. Dated May 24, 1892. The object of the invention is to provide a fastening for the meeting ends of harness straps which will enable the operator to secure these parts together with rapidity. The device is especially useful upon crupper straps, which it is often difficult to properly secure upon young or timid horses.

CABLE RAILWAY GRIP.—J. C. H. Stnt, San Francisco. No. 474,875. Dated May 17, 1892. The object of this invention is to provide a grip having one fixed and one movable jaw, and a means for operating the movable jaw. These jaws being so arranged with relation to each other and the cable as to allow the latter to be set a considerable distance to one side of the vertical plane, passing through a slot and parallel with the top of the cable tube.

SAFETY WATCH POCKET.—H. A. Liedel, Haywards, Cal. No. 475,017. Dated May 17, 1892. The object of this device is to prevent a watch being snatched or surreptitiously removed from the pocket and stolen. The invention consists in a casing of camoils or other material adapted to be inserted within the pocket of the wearer to receive the watch, said casing having a spring effectually binding and holding the watch in place. The object of the invention is to provide a simple device for receiving the watch, into which it may be readily slipped and as readily removed by the owner, but which will prevent it from being forcibly dragged out or even slyly removed by another person.

Powerful Turbines For Niagara.

The immense new pulp and paper plant of the Cliff Paper Company at Niagara Falls are to be supplied with late new designs of the horizontal shaft, double discharge, James Leffel wheels, built by James Leffel & Co., Springfield, Ohio. The contract for this work was signed by the Cliff Paper Company and James Leffel & Co., on the 13th of May; after this Cliff Company had made a full and careful investigation of the merits of various wheels presented during the past year for their consideration. Each of these turbines is to be 1100 horse power capacity; and built essentially upon the plan of their style No. 23, illustrated in the pamphlet of James Leffel & Co. These wheels will connect directly to the pulp grinder shafts at each end of the wheel shafts, without belts or gearing.

This water-wheel company has celebrated its thirtieth year of continuous business in this line of work. They have added many improvements to their James Leffel Wheel in the past two years; and have designed a large number of new styles, incorporating in them the best ideas of their large experience. The manufacturing plant of this company has also been recently greatly extended, and various pieces of new, improved and heavy machinery added; all adapted to the heavy water wheel work they are now manufacturing. They shipped, some time since, one James Leffel wheel and casing weighing 45 tons; also filled one order for 19 large wheels for one pulp and paper company.

Ramie Manufacture.

SAN FRANCISCO, 810 Castro St.,
May 16, 1892.

TO THE EDITOR:—The Department of Ramie Culture has been named by the State to have the ramie plant successfully introduced in California if possible. By correspondence, Mr. Walter T. Forbes of Atlanta, Ga., was invited to visit our State. He came, and has invested over one thousand dollars in machinery, to fully demonstrate that he can clean ramie fiber that has been decorticated and furnished him in ribbons.

Several trials of his "Patent Digester" were made in the city of San Francisco at cor. Eighteenth and Shotwell streets. Samples of the fiber so degummed were sent to the San Jose Woolen Mills by the undersigned to test the practical working. White blankets containing half ramie and half wool were manufactured. They looked fine and soft, and no doubt will be strong and durable. Also cloth was made for gentlemen's suitings, which was good looking for spring goods, being of equal parts of ramie and wool. Much credit must be given to the enterprising manufacturers of the San Jose Woolen Mills for demonstrating the use of ramie in this manner. They say the fiber is good and works well on the machinery and blends finely with the wool, no trouble being noticeable.

W. H. MURRAY,
Supt of Ramie Culture for California.

THE LATE J. J. REY.—The well-known pioneer lithographer, J. J. Rey, died at his residence in this city from inflammation of the bowels, after a brief illness. Mr. Rey was a native of Alsace and was born in 1820. He came to California in 1852 and soon afterward located in this city. He entered into partnership with Joseph Britton in 1855, and since that time the firm of Britton & Rey has been actively engaged in the lithographing business, nearly all the early maps of San Francisco bearing their imprint. The deceased leaves a widow and several children and a large circle of friends.

THE miners that left Duluth for Oeur d'Alene were intercepted at Butte by the labor organizations and induced to return or remain at Butte, greatly to the encouragement of the Idaho striking miners. The Poorman mine has been ordered to resume work at union wages, which also pleases the miners. The Oeur d'Alene district is no place for miners to go to just now.

THE Calaveras county miners are organizing. On last Saturday a preliminary meeting was held at San Andreas. I. H. Ried presided. A committee of twenty-five was appointed to draft by-laws and constitution and to report to an adjourned meeting to be held June 11th. The committee was selected from the most prominent mining men in Calaveras county.

THE members of the Astronomical Society of the Pacific hold their meeting June 11th in the library of the Lick Observatory, Mt. Hamilton. Six papers are announced.

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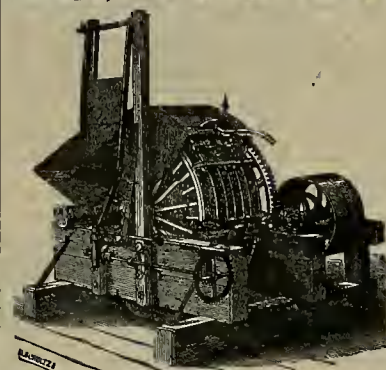
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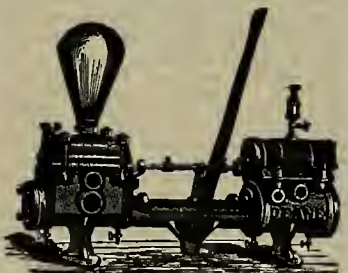
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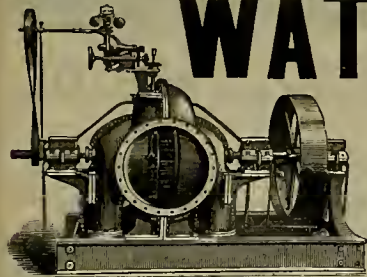
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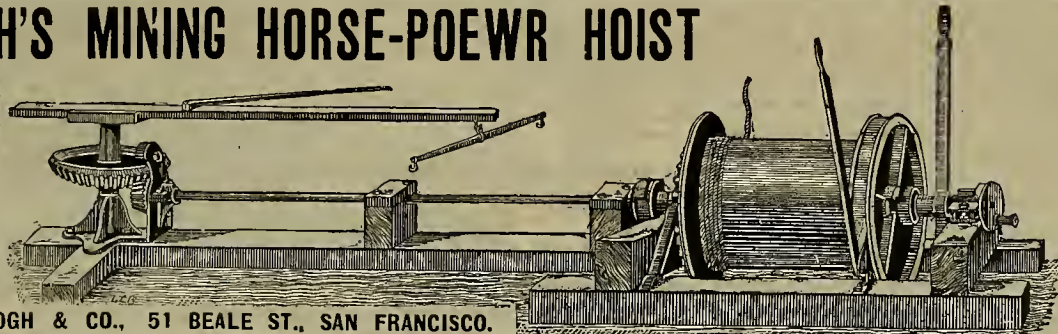
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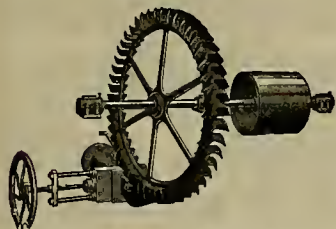
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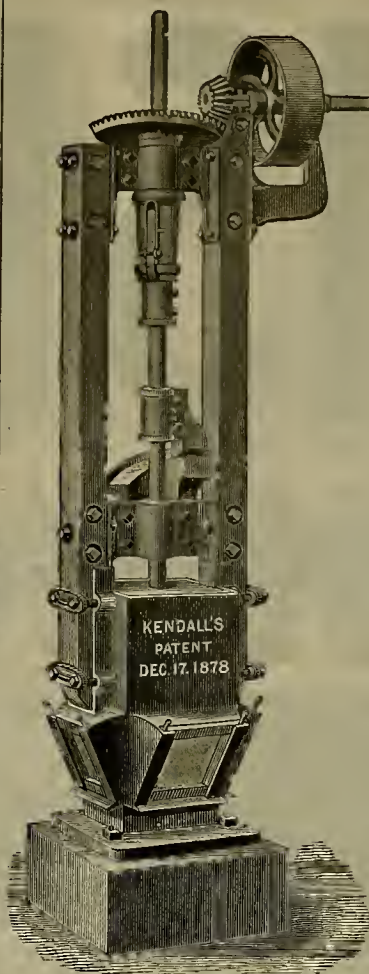
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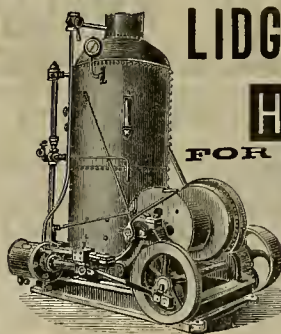
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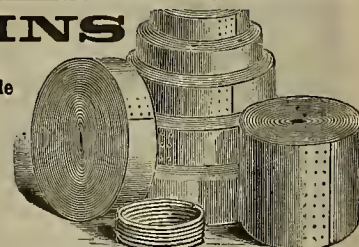
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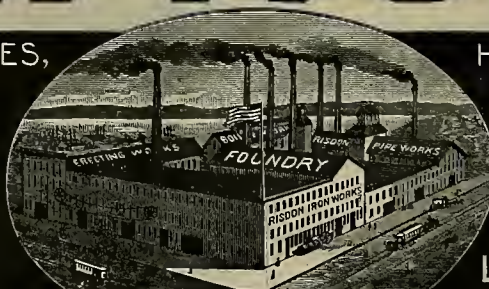
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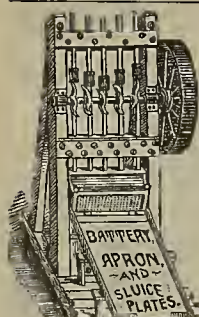
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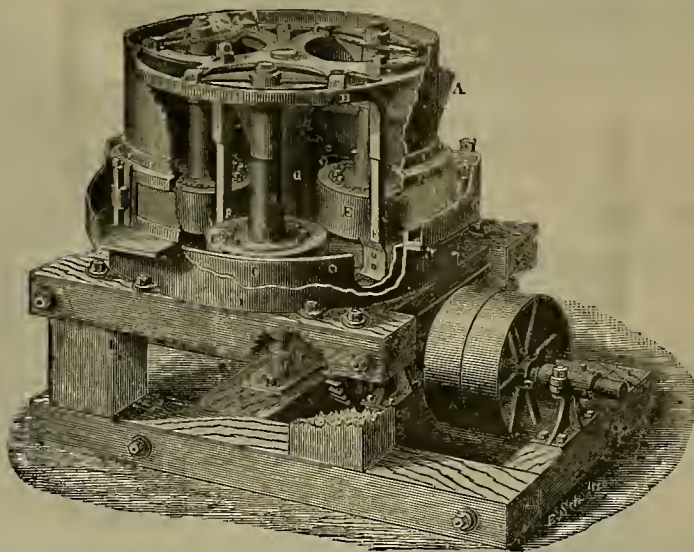
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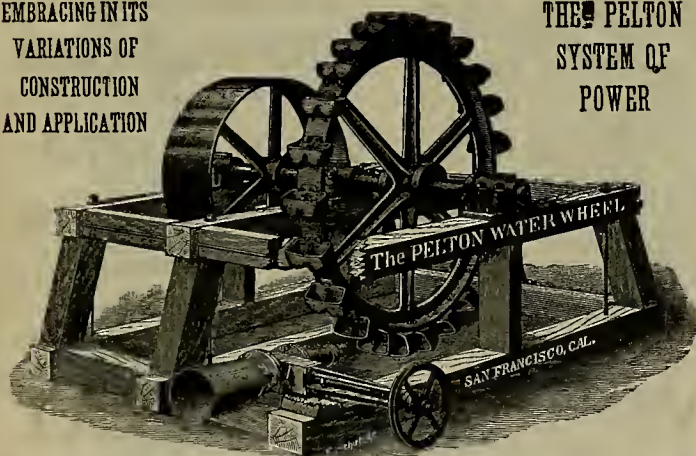
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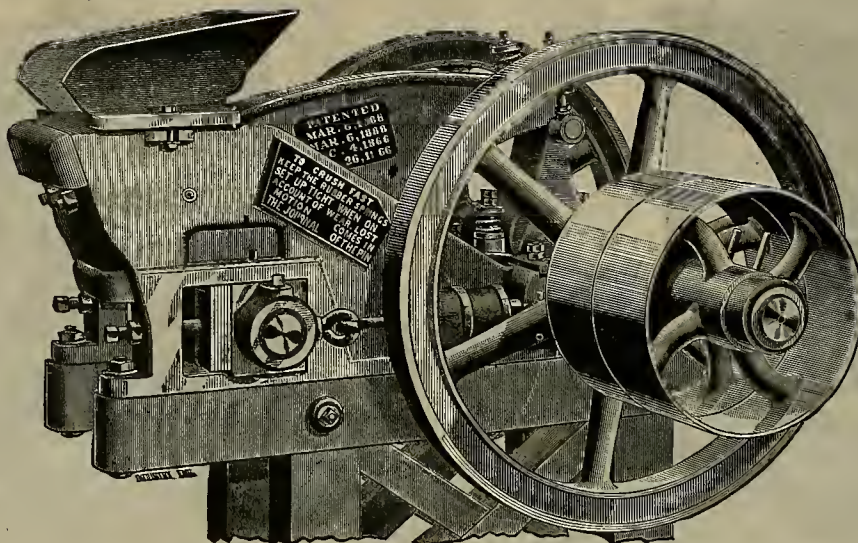
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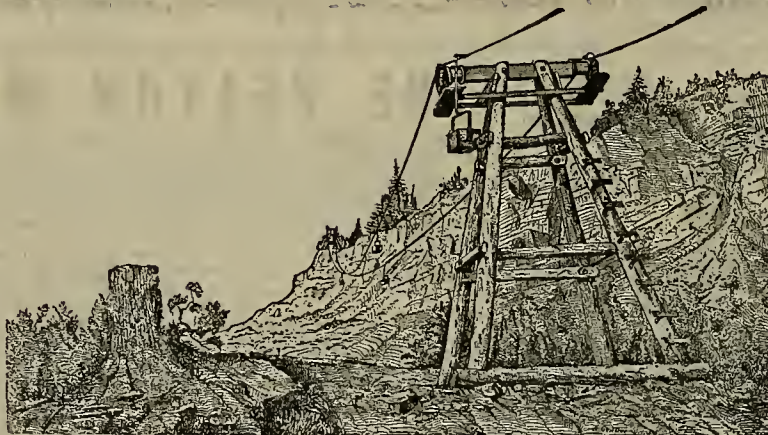
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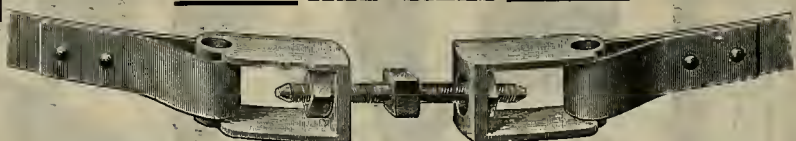
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXIV. — Number 24.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JUNE 11, 1892.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Air-Compressing Machinery.

In the MINING AND SCIENTIFIC PRESS of May 14th we gave illustrations of the concentrated piston inlet cold-air cylinder, air inlet valve and automatic regulator and unloading device used in the Ingersoll-Sergeant air compressor. These are very important improvements in air-compressing machinery. The free air, before admission

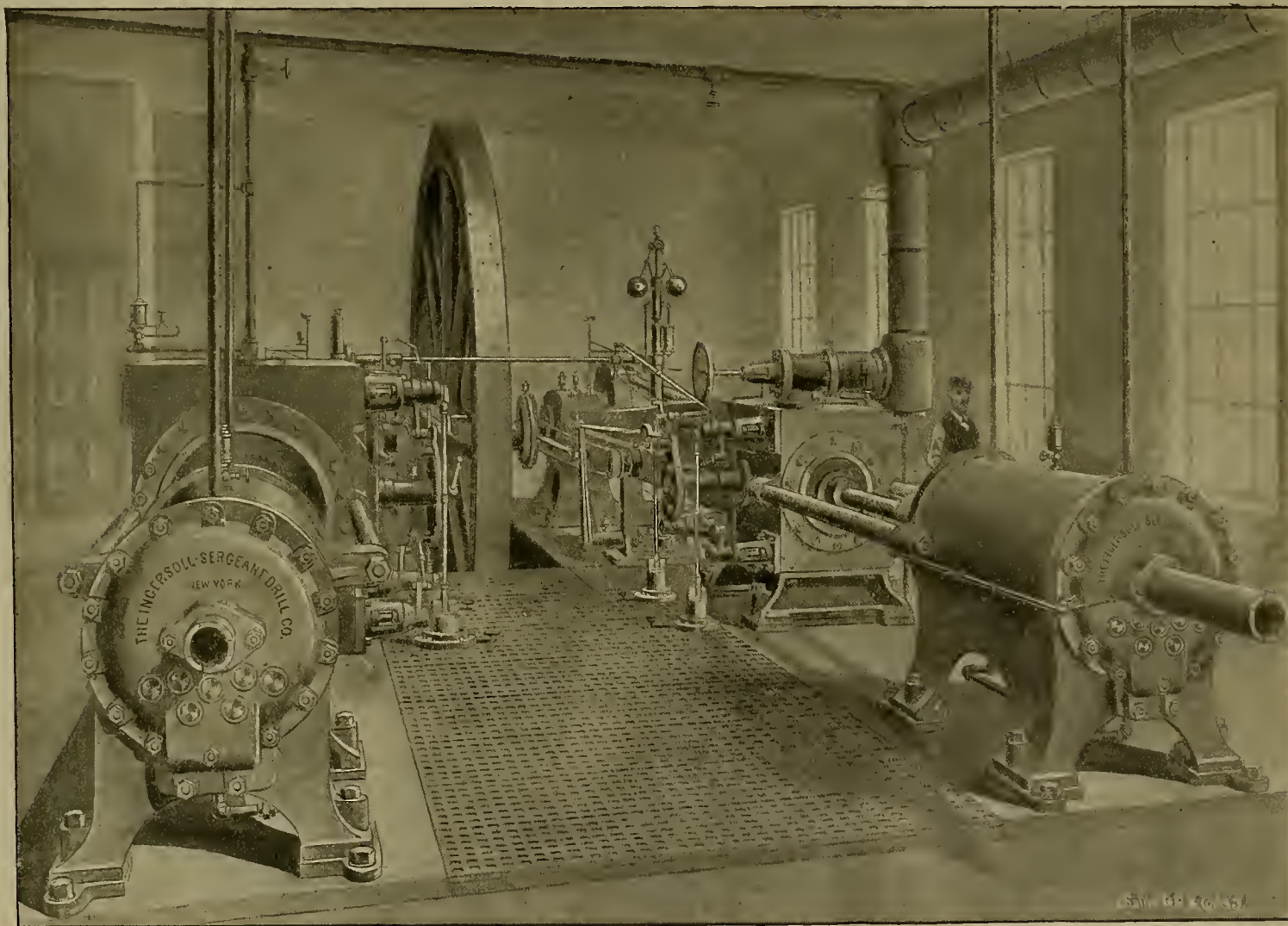
power or attention on the part of the engineer.

On this page is given a view of the Ingersoll-Sergeant duplex Corliss air compressor, with compound steam cylinders and piston inlet air cylinders. A condenser is used where the water supply will admit. That the piston inlet valve is as positive when working at low as at high speed is shown by tests made with one of these duplex Cor-

president of the Miners' Union, who was supported in his statements by quite a number of others. Many think that the averments in the affidavits do not meet the complaint, and that no trouble will be had in continuing the injunctions. The matter will be argued June 28th.

At the annual meeting of the stockholders of the Seg. Belcher and Mids Con. Mining

AGAINST THE CHOLLAR.—M. W. Fox is still on the warpath against the milling combine of Nevada, and Judge Hebbard granted his motion to be made a party plaintiff with Theodore Fox as the original complainant in the suit against A. K. P. Harmon, W. E. Sell, A. W. Rose Jr., C. T. Bridge, Joseph Marks, A. Hayward, W. S. Hohart (deceased), the Nevada Mill and Mining and the Chollar Mining companies.



INGERSOLL-SERGEANT DUPLEX CORLISS AIR COMPRESSOR.

to the cylinder, is under thorough control, and may be taken from that point which is most favorable in its dryness, reduced temperature and freedom from dust and other foreign matter. Indicator cards taken on the cylinder of this compressor prove that not only is the cylinder filled with air at atmospheric pressure, but in some cases the line runs above the atmospheric line to the same extent that it runs below in other air compressors. The purpose of the unloading device is to maintain a uniform air pressure in the receiver and a uniform speed of engine, notwithstanding the consumption of the air, and to do this without waste of

liss compressors running at only nine revolutions per minute. The Parke & Lacy Co. are agents for these machines on this coast.

THE mining troubles at Cœur d'Alene have not yet been settled. The Federal Court has been hearing affidavits in the case of the Cœur d'Alene mining troubles read by Frank Ganahl, attorney for the Miners' Union. He read some 50 affidavits, all tending to show that no such condition of affairs existed in Cœur d'Alene as set forth in the complaint, and that hence there was no cause for a continuance of the injunction. The principal one was that of O'Brien,

Co., the following officers were elected for the ensuing year: Thomas Anderson, Pres.; H. M. Levy, Vice-Pres.; and W. H. H. Hart, Herman Zsdig and E. B. Holmes, Directors. E. B. Holmes was reelected Sec'y and S. L. Jones, Supt. The Secretary's financial statement showed a credit of \$10,987.63.

THE Monarch mine, Silver City, Nev., which is in litigation, has brought out two shot-gun brigades, claiming possession. Silver City people deplore litigation over this valuable mine, as it suspends all operations.

This action is similar in nature to that in which M. W. Fox as plaintiff prevailed against the Hale & Norcross company, and obtained a judgment for the mining company for over one million of dollars. As in that case, several directors are charged with having combined with the directors of the Chollar company for the purpose of defrauding the stockholders of the latter corporation.

It is alleged that the milling company crushed 100,000 tons of Chollar ore, for which it overcharged to the extent of \$500,000, and besides realized from the tailings \$125,000.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ed.

The Mines of Tuolumne Co.

From our Traveling Correspondent.

TO THE EDITOR.—Throughout Tuolumne county at this time, mining matters may be said to be quiet. No one, however, should think them dead, as the big mines of this county are pounding away with all their old time regularity and profitability. While there is not a large number of new enterprises starting up, those on the way are proceeding in a manner that shows them to be stayers and expensive in their workings. The reputation of the mines in the county would be far better if the owners of some of the largest mines would allow correspondents to give the value of the ores. Mine owners seem to fear that if the true value of their ores were known the assessor would kindly ask the mine owners to bear the bulk of the county taxes.

Speaking in a general way,

THE ORES OF THE MOTHER LODE

belt, may be said to run from one to twenty-five dollars a ton, while the mines in the central and upper portion of the county range from eight to thirty-five dollars per ton in their free-milling value. In many of the mines a much higher grade of ore is encountered, but it is not, as a rule, average ore. In the Pocket mines the ores cannot be valued by the ton, as the gold occurs in spots only; but in Tuolumne county these pockets are so large in value that this class of mining is here as profitable, and the amount realized, equal to that of the largest mines of milling ores. Crossing over and into the county, the first mines encountered are those of

TUTTLETOWN.

Mining near Tuttletown is confined to Jackass Hill. There is quite a little settlement of miners on the summit of the hill; all of them are hard at work on veins that in times past have yielded many a bonanza. At this time, however, none of the miners are taking out any pockets. In one of the mines I saw a small quartz stringer that was studded with gold, and the miner was patiently and perseveringly following it down, in the hope that it would lead to a quartz crossing, and bring him into a bonanza.

RAWHIDE.

There is now being erected one of the largest and finest plants in the county, which, coupled with the past history of the mine, make this point the most interesting at this time, with every evidence that the interest will be kept up and increased in the years to come. All the work of the section is now centered in the Rawhide mine (W. A. Nevills, General Manager). The mine is situated at Rawhide, and is on the mother lode, which is here enclosed in a belt of very fine, serpentine slate, which may account, to some extent, for the unusual value of the mother-lode ore at this point. In the past history of the mine a large amount of very high grade ore was extracted. The richer ore was shipped to Swansea and ran from \$400 to \$2800 a ton. The last ore shipped to San Francisco yielded \$450 a ton and netted \$384. The ore which was not considered high enough in its grade to warrant shipment was milled on the mine and yielded an average of \$26 a ton.

With these high-ore values the owners held the mine and had it bonded for \$600,000. A silver mill was erected to treat the telluride ores. A portion of this mill is still standing, with its wainscoted interior, sun-fired and painted, mortar timbers and long row of pans and settlers. The mill was not adapted to this class of ores and is one of the many expensive experiments that have always attended mining when conducted by theorists. The present manager has had a long and successful practical experience and is proceeding in a way that assures success from the start. The property has three veins; two of these are parallel to each other with the remaining one almost so. The west vein is four feet wide on the surface and has not been developed. The center or main lode is about 20 feet from the west vein. This center vein averages eight feet in width and on it the principal work is now being done. On the north end of the mine a two-compartment shaft is now down 300 feet. The vein is here 15 feet in width, of high grade but uneven value.

Near the south end and 250 feet north of the old shaft, a fine three-compartment shaft has been put down 120 feet, and will be sunk to 500 feet as soon as the hoist is erected. The vein in the shaft averages eight feet in width. From this shaft crosscuts can be driven to the veins east and

west, if they do not come into the shaft in depth. The east vein differs from the other veins in this, that while they are large and free-milling, it is comparatively small, base, and very high in its value. At the old south shaft, where all the former work was done, the east vein joined the center vein. At this point of junction the center vein averaged \$60 a ton, while the center or base-ore vein ran up into the thousands in value.

At water level, all of the ores at this point became base, and the elaborate silver mill was erected. This east vein is from one to three feet in width and gradually bears away from the center vein as it runs north. Mr. Nevills is crowding ahead with a fine double-reel hoist, with a 40 stamp mill just unloading. It is his intention to work the free-milling veins extensively and cheaply by the usual battery and concentrator process and to treat the 2½ to 3 per cent of sulphurets that the vein carries, and which average \$120 a ton, by chlorination process. The rebellious ore will be handled as may be found most profitable. In all probability the richest ore will be shipped to some reduction works, while the lower grade ores will be crushed and concentrated.

Now, that the Rawhide has fallen into the hands of a practical and experienced miner, there will be no repetition of the old time experiments; but with plain, practical working the mine will be made to give up a satisfactory per cent of its values; and with its past history of exceedingly high values, the mine bids fair to come to the front as one of the most extensive and profitable mines on the mother lode.

QUARTZ MOUNTAIN.

The old Heslep sleeps on her laurels. Her companion, the App, is also idle. The only mine in operation at this time is the Dutch mine. Fitzgerald Bros. and Lucas own this claim. The Dutch is a well-known mine, and bids fair to keep up her enviable reputation as a producer of high grade mother lode quartz. At this time, the owners are sinking on the west ledge and have a very encouraging showing of rich rock. During the past year the ore from this shaft averaged close on to \$30 a ton. The ore from other parts of the mine has not been this high, but all of the ore extracted has paid a good profit. The Dutch wants a good shaft near the center of the claim, which, when down 600 feet, will undoubtedly show up a fine property, as there is contained within the side lines, both the veins of the Heslep and App mines.

GRAVEL.

Near Jamestown, Mr. J. Kallames is operating the Tuolumne Gold M. Co.'s property in the section known as Humbug Flat. The mine is in charge of Mr. D. H. Beecher. The property is opened by an incline shaft 400 feet long, and Mr. Kallames promised your correspondent a sight worth seeing on my next visit. The mine is said to be very good, but the owner is noncommittal.

PEORIA GRAVEL MINES.

This large gravel deposit, J. Prearia owner, has been leased for ten years by the Martha Washington Gravel Mining Co., an Oakland corporation, E. Hall superintendent. The property is situated on Peoria Flat, below Bald Mountain.

At this time the company is actively engaged reconstructing the ditch system. The property is opened by a tunnel 513 feet. This will be driven 300 feet additional and drain the entire flat. The deposit of gravel leased by the company is one mile long and one-half mile wide. The average value of the gravel is said to be \$5 a car of 1½ tons capacity. The gravel is what is known as free gravel, and is easily washed. To save the entire gold contents of the gravel, and avoid any conflict on the debris question, the company will operate the mines with the Bennett amalgamating process. The plant will have a capacity of 2000 yards per day of 24 hours. The inventor claims that his method will save every particle of the gold contents of the gravel, no matter how fine, as by his system the gold is forced by pressure through quicksilver 400 times, by which pressure he means that the gold to escape must pass through quicksilver 400 times. The plant includes a dredging outfit to supply the machine. It is the company's intention to operate the mines by electricity, which is made possible by the 300 feet of fall for water pressure on the mines. When in operation, the manager estimates that the plant will represent an investment in machinery alone of \$75,000. This may be said to be a new departure in gravel mining, and its operation will be closely watched by all owners of auriferous gravels, who are now enjoined from hydraulicking.

SONORA.

The old Bonanza is being given a general overhauling by Messrs. Oliver, Kelley and

Johnston. Everything about the mine shows that the operators have that faith in the future of the mine that comes of the great success in the past. The Bonanza has yielded about \$3,000,000 in the past, and promises to do as well, if not better, in the future. This mine should have the credit of producing the largest piece of gold mined in America. The fact that the miner, to facilitate its extraction, cut and broke the mass in two, should not cause the gold to be called two pieces, as it was one when found.

THE LAST CHANCE

Is the extension of the Bonanza, and is operated by the same company. The operators are stopping out old hacks at present.

THE GOLDEN GATE.

E. C. Loftus is superintendent of this mine, which is considered the leading mine in the county. Under Mr. Loftus' able management, the mine has been developed to a depth of 480 feet, with shaft going to 500, on a vein of eight feet. The plant is very complete and extensive. Unfortunately, the mine has had a very trying and protracted spell of "freeze out," which culminated in a series of lawsuits. The initial suit was just concluded at the time of my visit. In this suit Messrs. W. G. Long and J. C. Behlow claimed that by misrepresentation Mr. J. A. Fisher had caused them to transfer to him, without consideration, 32,000 of the 60,000 shares of the company's stock, which gave Mr. Fisher the controlling interest in the mine. The jury in the case were unanimous in their verdict in favor of Messrs. Long and Behlow, thus returning to them the controlling interest in the mine. The superintendent, Mr. E. C. Loftus, has also brought suit against Mr. Fisher in the Superior Court of San Francisco for the recovery of 11,800 shares of stock, which he claims was obtained from him by Mr. Fisher through misrepresentation.

The writer and the MINING AND SCIENTIFIC PRESS cannot champion the cause of individuals, but it is a promising sign when stockholders, who consider that they have been victimized, can go into court and recover not only their stocks, but the earnings of the same. If we can have a little of this new principle all along the line, mining will cease to be considered by San Francisco capitalists as a business only fit for knaves and suckers.

The Blatt & Gilson Co., under Mr. Tritenbach, has secured an extension of the Golden Gate mine and is reported as having a very promising mine.

The San Giuseppe is idle, pending litigation over the surface ground.

SOULSBYVILLE.

There is but little doing in this once lively camp. Not that the mines are not there, but the mines await the coming of a man with the requisite amount of "sand and soap" to drive out into the 2200 feet of unexplored vein of the famous old Soulsby mine, and thus cause her to add additional millions to her past record. That this mine will be reopened and additional ore shoots found, cannot be doubted. The past history of the property is such that if there was not a shaft 800 feet deep to drift from, the mine would be a far more promising property to invest in than the average prospect on which money is freely spent. With the 800-foot shaft the property is a prize.

THE BLACK OAK.

The Black Oak, U. P. Scott, superintendent, has produced thousands of tons of quartz that has given a steady average value of \$15 a ton. With a strong 6-foot vein to draw on, it is safe to predict that the mine has a good future before it. Just now the ore stopes have been exhausted, and the mill will be shut down until the shaft is put down an additional 100 feet and the levels run.

CHERCKEE.

Mr. Symons has out 150 tons of quartz on the Charlotta, awaiting transportation to the mill. It is safe to say that the ore will average \$35 a ton.

THE PORTO FINO.

The owners are pushing things on the mine and are encouraged to do so by the fine showing. At 80 feet I found the vein in the face of the drift to be eight inches wide of heavily mineralized quartz. The last crushing gave the owners \$25 a ton in free gold, while the sulphurets netted \$5 for each ton of rock, making an average value of \$30 a ton. The vein is free from the walls and gives promise of widening in depth.

In this section, as at Soulsbyville, and across at West Point, Calaveras Co., and Ophir, Placer Co., the veins are in granite. While many operators prefer a slate formation, the old Soulsby mine has shown that as good mines are to be found in the granite of California as the granites of Montana and

other mining sections where granite is given the preference.

THE KELTZ.

This mine is "over on the river," and owing to the circuitous and lengthy route to it, I did not visit the mine on this trip. The property is owned by a Scotch syndicate. The vein is wide and the quartz of good milling value. Owing to the favorable situation of the mine, it can be opened at a great depth by drifts run from the surface on the vein. All that the plant requires is a complete system of power drills and a more modern mill, when, under the present able management, it will soon come to the front.

OLD TUOLUMNE MINE.

This mine, R. C. Davis superintendent, is also "over on the river" above Columbia. Mr. Davis is pegging away at his long tunnel and expects to strike the ore shoot soon. Once this is encountered in the tunnel, the mill will be moved to the mouth of the tunnel and the expense of pumping and hoisting done away with for some time.

SUMMERSVILLE.

At the Eureka Cons., better known as the Dead Horse, things are running along smoothly. The owners, Messrs. Hayward and Hobart, have an excellent plant on the mine; and while there are no values given, the mine is thought to be as good to-day as at any time in its profitable past. Adjoining the Dead Horse is

THE LADY WASHINGTON.

This mine is very extensively developed, and by many considered the equal of the Dead Horse. The mine is being pumped out for inspection, and no doubt a sale will follow.

THE NEW ALBANY.

The mine is known locally as "The Dr. Walker mine." The superintendent is C. S. Fitch. The vein is opened to a depth of 800 feet by an incline shaft, and shows an average width of six feet with a slate hanging and granite foot wall. The mine has a ten-stamp mill, and the best evidence of the ore's value is the fact that the stamps are kept dropping from the proceeds of the mine.

THE BUCHANAN.

The Buchanan is sending out some very glowing reports of exceedingly rich rock in large quantity. The mine has been in the past a good one, and Mr. Davis is inclined to believe that she will continue in well-doing.

In Tuolumne county there are to-day several large mines that offer every inducement to capitalists seeking a large body of free-milling, gold-bearing quartz, with sufficient development in each case to prove the value of the mines. In each case the mines can be purchased on favorable terms and at prices which do not exceed, but are below the value. Once these mines are known, they will be sought after, and once equipped must add very materially to the prosperity of "Old Tuolumne."

E. H. SCHAEFFLE.

The Great Show—Its Uses and Purposes.

SAN FRANCISCO June 4, 1892.

TO THE EDITOR:—That the Columbian Exposition to come off next year in Chicago will surpass anything of the kind ever before gotten up, admits of no doubt. Not only so, but there seems little likelihood that the world will witness another such grand affair for many years to come. That it will not be duplicated in the early future may be assumed. None but a nation possessed of great wealth, advanced in the useful arts and rich in natural resources would be able to get up such an exhibition, nor would any other find it profitable to do so.

Many there are who affect to doubt the utility of these monster exhibitions, especially when attended by such heavy expenditures as the one we have now on our hands; nor is it easy to guess how much the concern is going to cost before we get through with it. Certainly it will require a great deal in the way of indirect gains to compensate for so much money laid out, time lost and energy wasted.

There is no denying that many of the articles displayed at these fairs are deceptive and misleading, being as a rule much better than those manufactured and placed on the market. Both the consumer and the connoisseur buying by these samples are apt to be disappointed. The machine built for exhibition is not the machine that gets into the mill, the factory or the workshop, nor is the fabric woven from selected material and with extra care, the fabric found on the shelves of the merchant and ultimately on the backs of his customers. While not in sympathy with this line of

argumentation we are free to admit that the objections suggested are not without weight. Ignoring however, the question of utility, there appear certain other matters connected with this subject about which all sensible persons should be able to agree. This Chicago Exposition, as we understand it, is not to be a circus nor yet wholly an advertising agency. Such being the case, there will be need to squelch certain spectacular exhibits which it has been proposed shall be made parts of the great show; thus, there has been advocated the building of a tower higher than any even yet erected, and this just to show what we can do in that direction, the project being otherwise purposeless. Another would have all the silver stored in our subtreasuries melted into slabs and from these *planchas de plata* have built a temple, vast and gorgeous; and this as a means of illustrating to visitors from abroad how great is our horde of metallic wealth, the addition of various other attractions, equally tawdry, far fetched and senseless, having been talked of and even strongly recommended; all of which suggests a danger that there may be engrafted on the show much that is meretricious and foreign to its purpose, which consists mainly in promoting the esthetic, scientific and useful, avoiding all that may prove offensive to the cultured taste. For the use of the mountebank, the clown, the commercial traveler and other of the more humble but not unpretentious industries, side shows might be provided. H.

The Cyanide Gold Process.

A Defender of It.

SONORA, Tuolumne Co., June 4, 1892.

TO THE EDITOR:—The same old, old story—prejudice and ignorance against progress; old things, because old, better than new things, however good. So sings "A Practical Miner" in your issue of May 21st, while writing of the MacArthur-Forrest or potassium cyanide process.

It is evident he knows little or nothing of the results obtained in America, Africa, Australia and elsewhere with this process. He seems to be utterly ignorant of the principles and operation of the process, and the literature of the subject, by which I mean the official and therefore authentic publication of results.

How true are the following lines:

A little knowledge is a dangerous thing,
Drink deep or touch not the Pierian spring.

How about the success of the process at the Mercur mine in Utah, Mr. "Practical Miner," where the yield by your pet amalgamation mode of \$4 per ton was carried to \$17 per ton and over by the cyanide process.

How about the result of the process in the Johannesburg mines in Africa, which produced over 80,000 ounces of gold last January, of which 18,000 ounces came from the cyanide process. These are but two from numerous instances of like successful results, of which "Practical Miner" no doubt has never heard. I give here the results of my own experience with the process. During the past 18 months I have tested the process on the most refractory ores of this county, the yield going from 86% to 95% per cent of the fire assay value. These are my facts against his assertions.

"Practical Miner" says, why has not the State Mining Bureau investigated the matter. He had better read the reports of the Bureau before talking. In the annual report of the State Mineralogist (1890) there is an article on the process by Dr. Wm. D. Johnston, chemist of the Bureau, in which he speaks of its future possibilities—possibilities then, realities now.

In industrial matters of all kinds—in every line, there is no more dangerous man, no greater drag to progress than the unlettered practical.

Yes, the cyanide process is a fraud and a failure; so says "Practical Miner." Others equally, if not more practical and of the largest experience and highest scientific attainment, which "Practical Miner" may lack, assert that it is a success after long and close scrutiny, having subjected it to the severest tests. Let the mining public judge between the two.

New things are always received suspiciously by purely practical men. I can recollect when the chlorination process, for several years after its discovery by Plattner, was denounced by just such practical men as your correspondent as a consummate fraud, and so was the Comstock or pan process that has produced over \$600,000,000.

There are innumerable instances of the unreasonable denunciation by practical men of new things; for instance, the locomotive. Some practical men asserted it would not go 10 miles per hour; some said it would not go at all, and some swore they would not ride behind the infernal machine. Such

is the force of prejudice, and ever will be, *e. g.* "A Practical Miner."

He contends that there has been no successful process introduced in late years, and that the country is strewn with the wrecks of abandoned processes. This is not true. If true, it is no argument against the cyanide process, which, so far from being a wreck, is a full-rigged craft with all sail set, making rapid headway.

His contention would check all inventive effort. We would still be pounding away with the old square stamps and driving mules around in a patio, taking six weeks to do what we now accomplish in six hours.

Well, Mr. Editor, this letter is not long, but is long enough to show that "A Practical Miner" knows nothing of the facts of the case he writes about, and therefore that his conclusions will carry no weight among sensible, reasonable men.

LOUIS BLANDING.

The Chick Process.

SAN BERNARDINO, CAL., June 4, 1892.

TO THE EDITOR:—I see in your issue of May 21st a request for information in regard to the "Chick" process in use some years ago in Redding. The same bad chick operated a few years ago in Colton and victimized all with whom he came in contact, winding up by easing a Riverside bank out of several hundred dollars by depositing a so-called gold bar and drawing upon it, saying it was worth about \$800; true value, about \$25 or \$30. Said C. was superintendent, previous to his advent in Colton, of the National City Reduction Works, and was given what is elegantly called the "grand bounce." After his sudden departure from Colton, he was next heard of in Kansas City, where he started a stock company for working his *secret process*, and was going to smelt all kinds of rebellious ores for \$3 per ton, and even interested ex-Governor Glick and a number of other prominent men in the company. But some of the bitten ones here heard of it and sent a full account of his escapades here and elsewhere to Glick, and so pricked the bladder.

The next place for his wonderful "secret process" was Pittsburg, Kansas, where he is enlightening the heathen and spreading himself, as you will readily perceive by perusing about every column of the copy of the Pittsburg *Star* which I send you. I also send you the end of a bar of so-called gold, which he passed out as "returns" of working a lot of ore by his "process," but which I analyzed and found to be "babbit" metal.

So it no doubt will be found that the only thing about the "Chick" process is, that it is a clumsily contrived plan to get money out of the pockets of gullible people and not out of any ore which may unfortunately go through his "secret process." The gist of the whole thing is that the "chick" came from a bad egg. Yours truly, "S."

Processes and Men.

ROCKY BAR, Cal., May 31.

TO THE EDITOR:—I notice in your issue of May 21st you ask for information regarding the "Chick" process, introduced at Redding. I cannot give you details, but inasmuch as the scheme failed I presume that like his operations in Henley in Siskiyou county, and Deadwood, in Trinity county, and subsequently in San Diego county and San Bernardino county, it consisted chiefly in extracting money from the pockets of gullible investors. In that he has been a success, but as for any beneficial results in working ores he has developed nothing.

How strange it is that so many men are induced to put up money on patent or secret processes, alleged to produce wonderful profits from poor ores, promulgated by men who either have never made a success, or are totally unknown to the mining world. Stranger still that the advice and caution of practical men of years of experience and untold trials of processes are unheeded.

Barnum was not far wrong when he stated that "the world liked humbuggery." There are a few, however, that "prefer to have the boil on the other fellow," and if men will rush into untried methods in the hope of obtaining riches from an assumed loss of metal they deserve no sympathy. The sympathy should be bestowed upon the mining interest that has suffered more from charlatanism than has any other industry in California.

ALA MILMAN.

PLATINUM LIGHT.—M. Paquelin has described in the *Comptes Rendues* an incandescent platinum light devised by him. The apparatus consists of a strip of platinum coiled on itself and placed in a platinum bowl with a hollow stem. A gaseous mixture of air and some hydrocarbon vapor is then introduced under pressure in suitable proportions. The mixture is set alight, the flame disappears, and the platinum strip incandesces, the incandescence being the more intense the greater the pressure. With moderate pressures, the light is comparable with that emitted by an electric lamp. The whole apparatus can be plunged into water without the light being extinguished.

Rich Oil Fields.

Remarkable Discoveries in the Foothills of Kern.

Out in the foothills of the Coast Range of mountains, about 35 miles to the south and west of Bakersfield, says the *Californian*, lie some of the most interesting resources of Kern county, which are now being rapidly developed, and which have recently drawn a great deal of attention to Kern county.

Here are the Sunset and Buena Vista oil fields. For a generation or more they have attracted the attention of capitalists, and company after company has been formed only to abandon the field after unsuccessful attempts to reach the precious oils to which surface indication pointed, and often with the fruitless expenditure of many thousands of dollars. In spite of these failures, two enterprising citizens of Bakersfield—Solomon Jewett, president of the Kern Valley Bank, and H. A. Blodget, cashier of that institution—had an abiding faith that oil lay in the rocks below and could be found in paying quantities. About two years ago they began acquiring oil territory by purchase or lease, and now control two belts of territory. Their Sunset fields lie along the lowest foothills, eight miles to the south of Buena Vista lake, and comprise a stretch of ground about six miles long by one mile wide. The Buena Vista fields are of about the same extent and lie several miles to the northwest.

SPRINGS OF MALTHA.

The surface indications of oil in these fields consist of springs of maltha or liquid asphaltum, which, through the course of centuries and perhaps ages, have slowly flown upward and outward, forming cones of asphaltum which have as steadily been buried by blowing sands and the gravel washed down from the hill. From the top of each cone the black, oily maltha slowly oozes and gradually trickles in various directions in sticky, glistening rills.

BORING THE WELLS.

When Messrs. Jewett & Blodget were ready for practical operations about two years ago, they employed as superintendent of the works W. E. Youle, who has had many years of experience in the oil fields of the Pacific Coast and who is regarded as among the best practical operators in the State. From the first, efforts have been made to find the lighter oil, which it was believed awaited discovery, but these efforts were fruitless until the rich strike of lubricating oil made a few weeks ago. As the boring of wells went on, nothing was found but maltha, which, however, was a very valuable feature of the asphaltum deposits. It was found that the asphaltum existing here in almost inexhaustible quantities was in quality equal for every use to the very best produced in any part of the world, and at an early stage of the operations preparations were made to prepare asphaltum for the market. L. Blankenhorn, of Los Angeles, who had had several years of successful experience in handling the products of other California oil fields, was associated with the enterprise, and the firm of L. Blankenhorn & Co. was established for the refining of oils and the manufacture of refined asphaltum, for varnishes, pipe-coating, etc., from the maltha or semiliquid asphaltum above described. Operations have been mainly confined to the Sunset fields so far, and here a number of wells have been sunk, from nearly all of which maltha is steadily pumped. This product, which contains a small percentage of oil, is used for fluxing the hard asphaltum, which is dug out of the surface deposits in a high degree of purity. The work of refining is done partly at the fields but largely at the company's refinery at Sumner. From Bakersfield a large and rapidly increasing amount of refined asphaltum is being shipped, and this point bids fair to become, in the near future, the largest producer of this article in the State and to become noted throughout the country as the chief place from which refined asphaltum comes.

As important and extensive as the production of asphaltum is sure to become in Kern county, it bids fair to be eclipsed by the yield of oil, the recent discovery of which has excited so much attention.

THE LUBRICATING OIL.

About three months ago Superintendent Youle, after a careful study of rock strata and surface indications, started a well about

a mile from the main group of maltha wells, and after reaching a stratum of sandstone at a depth of about 200 feet, a flow of dark greenish oil, entirely different from anything found before, was struck.

The oil was subjected to tests and submitted to experts, with the result that it was pronounced to be a natural lubricating oil fully equal to the famed natural lubricating oil found in West Virginia. Lubricating oil is by far the most valuable oil taken from the earth, and the recent strike has established the richness of the Sunset oil fields in the quality of their product. How extensive the yield will be the future must determine, but the indications now are that Kern county will have the most famous oil fields on the coast, although other fields have yielded millions.

THE ASPHALT FIELDS.

The Buena Vista asphalt fields have so far been but little worked by the Standard Asphalt Company, but extensive operations there, will follow the completion of the Southern Pacific Company's branch line from Bakersfield, which is now being built to the foothills as far as these beds, and which will ultimately be extended to connection with the West Coast line.

The refined asphaltum of the Standard Asphalt Company has been already extensively shipped to Portland, Denver, Ogden, Kansas City, Sedalia, Los Angeles and other points west of the Missouri river, where it is acquiring prestige as a paving material, as well as for coating reservoirs, roofing, etc. The uses to which asphaltum may be put are but just being generally discovered. It makes an ideal coating for reservoirs, flumes and irrigating ditches, surpassing cements in its adaptability for these purposes. As a pipe coating, it has been in use in California for years, and is now shipped East in considerable quantities for this purpose, superseding coal tars, for whose defects and lacking qualities, engineers have sought a practical and cheap substitute now found in California's products. Among the other uses for asphalt in the arts and industries are in roofing and roofing paper; fuel briquettes, varnish and paints, japanning of iron, coating of piles, dock, bridge and tunnel timbers, cisterns and tanks; substitute for rubber, electric insulation, printing, lithographers' ink, etc.

The development of the resources of Kern county described have but fairly begun, and the future promises a rich and unlimited production.

Gold from Sea Water.

The researches of Malaguti, Durocher, Sarzeand and Sonstadt on the practicability of extracting the precious metals from sea water have recently been supplemented by a careful investigation made by a Scandinavian, Herr Munster. According to his method, sea water was taken from Kristiania Fjord, and 100 liters were evaporated to dryness, giving 1830 grammes of residue. This was ground and divided into portions of 300 grammes, each of which was mixed with 100 grammes of litharge, 100 grammes of pure potassium-sodium carbonate and 4 grammes of carbon from starch, and the silver and gold determined. The result was 19 milligrammes of silver and 6 milligrammes of gold per ton of average sea water. Considering the extremely small amounts of precious metals present, Herr Munster considers that no method of precipitation in tanks can possibly be successful. He is of opinion that the precipitation must be effected by the sea itself, where the water is continuously renewed by a natural current, and he points out that the copper sheathing of vessels has long been known to precipitate silver under these circumstances. He proposes that a channel about 60 yards wide, between two small islands, well sheltered from sea or wind, where there is a current of about 13 feet per minute, should be selected for an experiment, such rocky islets being common off the Norwegian coast. Across this channel 60 plates of galvanized iron, each 7 feet by 10 feet, should be arranged at an angle of 30° to the stream, and an electric current be passed through the series to precipitate the precious metals. The power required theoretically for this purpose he calculates at one-half horse power. The large anodes needed, could, Herr Munster says, be cheaply prepared from wood, impregnated with graphite and tar, and carbonized, high conductive power not being required for so weak a current. If all the precious metals passing these plates were precipitated, he estimates that there would be a net yield of £300,000 per annum, and if only the one-hundredth or even the one-thousandth part of this amount were obtained, a substantial profit would accrue in view of the insignificance of the working cost.—Iron.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—*Ledger*, June 4: A considerable cave occurred last Friday in the north shaft of this mine, involving about ten sets of timbers, or a distance of 50 feet. This shaft is mainly for ventilation, and the cave shut the air supply from all the levels, making it impossible for the men to work until the shaft is reopened. The 900 level is supplied with air by a compressor at the 800-foot level, but as the 800-foot level, which is the depth to which the north shaft extends, depends for air upon the caved shaft, the men were unable to work the compressor. The air was so bad that a candle would die out almost immediately. All work in the various drifts is out of until the ventilation is restored. The cave occurred by the dry rot of the shaft timbers, consequent upon hot air coming through the shaft. The timbers were replaced about four years ago. A force of men are at work breaking through the debris, and it is expected that the air current will be restored in a few days. The mill has come to a standstill, and also all underground work, except in the damaged shaft. Only a small portion of the surface ground around the shaft is affected by the cave.

KENNERLY.—An accident happened at the south shaft on Monday last. They had made a new underground waste dump at the 800 level, and fixed it so the skip would dump itself. In hoisting from the lower level to this dumping place, the engineer, for some reason unexplained, omitted to slack off on reaching the dumping place. Something had to give way. It was a trial of the engine against the shaft, and the weakest point proved to be the reel upon which the cable is wound. This was pulled completely out of its place, wrecking things considerably, and bringing all operations in that shaft to a standstill until the damage can be repaired. They have another shaft, however, so that work can proceed, and the mill will be kept running.

CLINTON CONSOLIDATED.—The force at this mine has been reduced about 15 lately, on account of the introduction of air-compressor drills. Mr. Gutman went to San Francisco Wednesday morning.

QUARTZ MOUNTAIN.—The 20-stamp mill crushes an average of 65 tons per day. The ore carries about one per cent of sulphurets of very high grade, which yields an average of \$500 per ton. Unlike most of the mines of the county, the sulphurets contain one-third of their value in silver, and hence they have to be shipped to the Selby Smelting Works of San Francisco for treatment, there being no works in this county for the saving of silver. A test trial of the Woodbury and Frue concentrators has been made at the mill. When Mr. Farwell took hold of the property he put in Woodbury machines, for the reason mainly that Frue machines had been tried there by others, without success. The test, however, has revealed very little difference in the work of the machines. The Frue seems to do its work just as well as the Woodbury, and vice versa. The saving of the fine, high grade sulphurets, which baffled all predecessors, presents no difficulties worth speaking of to those now in charge, and it is a matter of surprise to them that the mine was not worked at a profit as this. Nearly one-half the gold yield is caught in the batteries and on the plates. The batteries are double-discharge, with all-iron frames, and give much better satisfaction than the old style. The company will probably increase the milling capacity to at least 40 stamps. The dimensions of the ore body would justify this, or even an 80-stamp mill, and the rock being low grade, it is only by running through a large quantity that it can be made to pay a handsome profit to the owners.

BAY STATE.—A dispatch was received by Dr. Boyson from the Superintendent, W. T. Jones, Thursday morning, stating that the ledge had been struck 40 feet from the shaft; that the ore body is large, and apparently of good quality. The stockholders are greatly elated over this news. Dr. Boyson is a large shareholder, and wants to get more stock, but there is no stock offering. Propositions have been made to purchase all the unsold stock in the hands of the company, at the paid-up value of the assessment stock, but it was deemed best to decline the offer.

MISCELLANEOUS.—It is reported that the New London is to be refitted with new machinery and started up again. Assays of the ore made below give a value of \$7.50, which ought to yield a handsome profit. It is this rumor that has given birth to the revival of the mine.

SUTTER CREEK.—*Cor. Amador Ledger*, June 4: Lowering the water in the Hector mine has progressed at a rapid rate the last week. There have been no tunnels nor drifts to draw from, and as much as 20 feet has been made in one shift. They are nearing the 400-foot level, and the shaft is still in very good condition. They are about to open a drift between the 300 and 400 levels, where they expect to find some good pay ore, which will materially help in the way of defraying expenses. The mill will be beatified with this end in view as soon as practicable. Crosscutting in the South Eureka has started in earnest. They are drifting east and west, and making good headway. It is thought the ledge will be encountered in a very short distance. At the Belmont, work is progressing favorably, and the prospects are reported as satisfactory. Work is still being continued on a slim scale at the Lincoln.

Butte.

QUARTZ AT BIG BEND.—*Chico Chronicle-Record*, June 4: Robert L. Bohannon is a lucky man.

A short time ago he had the good fortune to find a ledge of rich, free-milling, decomposed quartz on his place at Big Bend. He had some expert miners look at the portion of the lode which he had laid bare, and they pronounced it first-class. The ledge is situated near the mouth of a small gully which comes down from the hills and lies between two points of rock. The lode is about 20 inches wide on top, but it is not known how deep it is, nor is the width on the bottom known. The find has been laid bare to a depth of three feet, but there a point of rock was struck and work suspended for the present. Not being a miner, we dare not venture an opinion as to the actual worth of the deposit in this ledge, but we have it from some old miners and prospectors that they consider the lode found by Bohannon the equal of the Rainbow mine. The ledge is rich in free gold and sulphurets, and it is believed that these deposits are continuous during the entire length of the ledge.

Kern.

SILVEA ORE.—*Kern Co. Californian*, June 6: Andrew Sausser of Agua Caliente was in town Saturday and left some silver ore from his new find at the office of the *Californian*, to be sent with the Kern county mineral exhibit to the World's Fair. The ore is very rich indeed. It very much resembles some of the highest grades of silver ore from Calico district, and shows horn silver and "black metal" in abundance. He has sunk a shaft 20 feet deep upon his claim, finding a vein averaging 12 inches in width of this rich silver ore, and so far as he has prospected upon the surface, he has found an ore chute 46 feet long. Several locations have been made upon this vein, which can be traced for a long distance, and in one other place at least, ore of the same quality and richness has been discovered. This strike is creating a great deal of excitement, as well it may, and already 16 claims have been located. The mines are easy of access, with ample water and timber for working purposes, and therefore too near home to cause much of a stampede. They are located in what is called the Agua Caliente district, easiest of access by way of Waker's basin, and can be reached over good roads in less than a day's travel from the railroad station of Caliente. Mr. Sausser discovered the outcroppings last fall, but only recently commenced active work upon the vein. He has already had several tons hauled to the railroad at Caliente, and expects soon to ship a carload to San Francisco. It must be confessed that the disc very of silver ore in that locality is a new thing. That whole region has been prospected over and over again for gold, and many tons of fair and even rich milling rock have been extracted in times past. The Stuter & McKay group of mines in that locality is still being profitably worked for gold, and, near by, Mr. Sausser himself has about 120 tons mined out to arrastre, which will yield from \$20 to \$25 per ton in gold.

Los Angeles.

SNELTER.—*Oil Reporter*, June 4: Two weeks ago Maj. L. C. Moreland sold half of his gold mine on the desert to Chicago parties for \$45,000, and it was stipulated in the articles of sale that the company should erect at once a mill on the property to cost not less than \$25,000. Major Moreland is at present on the grounds, and as soon as the erection of the mill commences will return to this city and give his attention to the proposition of starting a smelter here. Propositions from San Diego, San Bernardino and Needles have been made to Major Moreland to interest himself at one of those places, but having given the matter a personal investigation, he has wisely concluded that Los Angeles is the most desirable point for such a plant, owing to the unrivaled railroad facilities which this city enjoys.

Mono.

CONCORDIA.—*Bodie Miner*, June 3: Work has been resumed on the Concordia mine, which has been idle for several years. During the booming days of Bodie, it was a mine of considerable importance, and some very rich silver ore was taken out and milled at the Noonday mill. We understand that work will soon be resumed on the consolidated Pacific, and the ore, of which there is a large quantity in sight, will be treated by a new process, and one that experienced millmen think will be successful.

THE BODIE CON.—*Miner*, June 3: During the past week east crosscut No. 1, 700-foot level, was extended 9 feet. East crosscut No. 1, 550-foot level, was extended 7 feet. North drift from east crosscut from above level was extended 11 feet. We have a seam of ore in this drift that is very good. Upraise above the 400-foot level was extended 8 feet. There are about 8 inches of \$30 ore in this drift.

MONO.—During the past week north drift from west crosscut, 600-foot level, was extended six feet. Upraise from east crosscut, same level, was extended 12 feet. There is a very rich seam of ore in this upraise. West crosscut No. 2, same level, was extended 11 feet. We are taking out pans and settlers at the Bulwer mill and moving them to the Bodie.

Nevada.

NOTES.—*Grass Valley Union*, June 7: The Merrimac mine is looking well, and is giving every encouragement of yielding profitably before long. A force of four men is at work on the Osborn Hill mine, in retimbering the main shaft near the surface, and in removing the debris that has accumulated in the shaft during the many years that the mine has been idle. It is thought that the shaft will be found in good condition below the water level, which will be at a depth of about 65 feet from the surface. James Paul is foreman of the work that is being done.

Orange.

THE TRABUCCO COMPANY.—*Los Angeles Oil Reporter*, June 4: Several mining companies have been organized and incorporated in Los An-

geles during this month, the latest organization being the Trabucco Gold Mining Company. The properties of the company are situated in and near the head of the Trabucco canyon, in Orange county, about one mile from the dividing line between San Diego and San Bernardino counties—62 miles from this city. There are four quartz mining claims, as well as a mill site of five acres, with an abundance of wood and water in close proximity. Considerable tunneling has been done on the claims, and in every instance the result has been most satisfactory to the company, the ores assaying from \$9.80 to \$48.60 in gold and from three to eight ounces in silver, the veins being from eighteen inches to three or four feet in width. There is at present 500 tons of ore on the dump, and it is the intention of the company to commence at once the erection of works on the property, and the development on the claims will be proceeded with immediately under the superintendency of Mr. John Corbett, a practical and experienced miner. The Trabucco gives hopeful promise of becoming a big paying property and the directors feel assured that it will prove a veritable bonanza.

Sierra.

HANDSOME GOLD YIELD.—*Mt. Messenger*, June 4: The aggregate cleanups of the Bald Mt. Ex. Drift mine, for the past month, 24 working days and like number of gravel pickers, were 864 ounces and 17 pennyweights—\$16,68.84 paid for the gold by Scamman's Bank, Downieville. One nugget weighed 22 ounces, and others from one to several ounces. About 50 men are employed, and indications are very favorable for a good paying property for years. Dividend No. 19, of ten cents a share—\$6000—was declared this week, for the lucky stockholders.

Siskiyou.

QUARTZ AND GRAVEL.—*Yreka Journal*, June 1: Schroeder & Werner, of the famous Deadwood quartz ledges near the summit of Deadwood mountain, about nine miles south of Yreka, have been taking out considerable fine-looking quartz from the stopes of the eighth level, and next week intend putting on a night shift, so as to keep the mill in operation day and night. Arthur Scheld and Clarence Davis still continue to get out rich-looking ore from their ledge on Long Gulch, and will soon have enough on the dump for another crushing in their mill. The Boyle quartz mine at the head of Humburg creek is yielding very rich quartz in great quantity, and the work of crushing is carried on energetically by working both a stamp mill and one of the Huntington grinding mills. Leonard & Co., just above the mouth of Scott river, on the Klamath, are putting in two mammoth windmills, and expect to take out considerable gold this summer. This claim paid handsomely last season, and also during the previous season of two years ago. The Chinese company working the Benz Bar claim at Honolulu, on Klamath river, are reported as doing exceedingly well in taking out gold dust. This company of about a dozen stockholders usually make dividends of \$800 to \$1000 to each man in two or three weeks' time when their claim is in good working order. At present they are short-handed on account of Chinamen not being so numerous as in former years.

Tuolumne.

BUCHANAN.—*Union Democrat*, June 4: A rich body of ore was struck last Thursday morning in the Buchanan mine. A drift was being run to tap the old works, when the rich ore was encountered. The extent of the ore body is unknown, but gives every promise of being large. The mine, we understand, is looking very encouraging in the old works. The ore in the drift in which Daley was killed is reported to be very rich in free gold.

NEVADA.

Washoe District.

CON. CALIFORNIA & VIRGINIA.—*Enterprise*, June 5: 1600 level—We have continued prospecting upward from the old sill floor of the old stopes, from which some ore of fair quality is being extracted, and some very good ore has been taken out along the ore streak on the east side of the old timbers. 1650 level—Have continued prospecting west from the upraise 35 feet above the sill floor, which was carried up 59 feet above the southwest drift. Ore of fair quality has been extracted from the drift running east from winze No. 3, 73 feet down, in working upward from that point. From the north end of the California ground on the west side are working in the old stopes and extracting therefrom some ore of fair quality. The drift started south from the bottom of the winze sunk 28 feet in this locality through the old timbers has been advanced 30 feet in a porphyry formation carrying narrow streaks of quartz of very low assay value. There has been extracted from all parts of the mine during the week 1029 1660-2000 tons of ore, which was shipped to the Morgan mill, the average value of which, per car samples, was \$30.47 per ton. The average assay value of all the ore worked at that mill during the week (980 tons) was \$26.54 per ton, per battery samples. Bullion shipped to the Carson Mint, assay value, \$33,877.40.

OPHIR.—1465 level—The drift running south 101 feet below the sill floor of the 1465 level, from the Mexican into the Ophir ground has been extended during the week 17 feet; total length 70 feet; and we have extracted therefrom and raised to the surface 36 tons of ore, the average assay value of which was \$21.92 per ton. The face of the drift is in porphyry and quartz carrying an assay value of \$3 per ton.

MEXICAN.—On the 1465 level the drift running north from the crosscut run east from the bottom of the winze sunk 101 feet below the sill floor of this level near the south boundary of the mine, at a point 40 feet east from the winze, has been advanced 16 feet; total length 46 feet;

continuing in a porphyry formation, showing fine lines of quartz and some clay.

GOULD & CURRY.—On the Suto tunnel level the joint north drift with the Savage Co. has been temporarily discontinued on account of the air not being good enough to work with. In order to obtain better air we have started a joint upraise in the Suto tunnel, near the mouth of this drift, with the Savage Co., to make connection with their 1500 level. The upraise has been carried up a distance of 65 feet; face in quartz and porphyry.

BEST & BELCHEA.—900 level—East crosscut No. 1 has been advanced 18 feet through hard porphyry; total length 194 feet. West crosscut No. 1 has been extended 22 feet; total length 283 feet; through a formation of hard porphyry and stringers of quartz.

HALE & NORCROSS.—On the 800 level are repairing north drift. On the 900 level we continue to stope ore from above this level and extracted from same during the week 256 cars of ore. The stopes on this level are looking about the same as at last report. 1000 level—Have advanced the south drift from bottom of 900 north winze 20 feet, making the entire length 35 feet. The face of the drift shows some pay ore. 1100 level—Are stopping out ore from north and south stopes, and advanced the south upraise in south stope 25 feet; face showing some ore of fair quality. The stopes on this level are not looking as well as at last report. Hoisted from this level during the week 167 cars of ore. 1300 level—We are stopping out ore north and south from winze. There is no change of importance in the appearance of these stopes. Are also working at the new station on this level. Hoisted from this level during the week 49 cars of ore. 1640 level—The main incline was cleaned out and repaired a distance of 45 feet the past week. The total depth below Suto tunnel level, 60 feet. We have men on repairs in the main shaft and at other points in the mine where necessary. Hoisted during the week 472 cars of ore. Shipped to Brunswick mill 429 170-2000 tons. Average assay of railroad car samples of ore shipped to Brunswick mill for the week, \$20.08; average battery assay for the week, \$14.66. Shipped from Brunswick mill to U. S. Mint, Carson, bullion of the assay value of \$11,548.31—this being the final shipment on May account.

OCCIDENTAL.—Have commenced extracting ore from the stopes on 300, 350, 400 and 450 levels, and will start the mill on Monday, June 6th. West crosscut No. 2, 750 level, is in 60 feet and continues in low-grade ore. The main north drift on this level has been connected with No. 1 winze sunk from the 650 level, and a crosscut has been started from the bottom of the winze. The Zadir drift from the Suto tunnel is now in a total distance of 592 feet.

ANDER.—On the 420 level north drift from west crosscut No. 2 advanced 5 feet, connecting with west crosscut No. 3. Work resumed on west crosscut No. 3 and same advanced 20 feet; formation, clay and quartz.

POROSI.—Are repairing Werrin shaft from surface to 250 level. South drift from winze, 1500 level, is out 60 feet; face in quartz and porphyry. The south winze, 20 feet south of winze connection, 1200 level, is down 21 feet. In the bottom there is 3 feet of ore that gives low assays. The joint Bullion winze is down 347 feet below the 1500 level; bottom in low-grade quartz. Extracted and sent to the mill the past week 380 1600-2000 tons of ore from the 930, 1100, 1150 and 1200 levels. Milled during the week 415 tons. On hand at mill 46 800-2000 tons. Average battery assay, \$19.66. Average car sample assays, \$23.69. Sent to Carson 4301 pounds of crude bullion.

UNION SHAFT.—The joint Sierra Nevada and Union west drift, 900 level, was extended during the week 30 feet, making a total distance west of shaft of 2054 feet; face in porphyry.

SIERRA NEVADA.—The west crosscut No. 1 from north drift, Kenosha tunnel, 1000 feet in, has been advanced 28 feet; total distance, 123 feet; face in hard porphyry. The joint Sierra Nevada and Union west drift, 900 level, was extended during the week 31 feet, making its total distance west of shaft 2054 feet; face in porphyry.

CHOLLAR.—We are making repairs on the 450 and 750 levels. The north drift from the station, 930 level, has been repaired to a distance of 450 feet from the station.

CON. NEW YORK.—The north drift from No. 4 crosscut, 650 level, is out 43 feet, the whole distance in low-grade ore. Are cutting out for a winze station to sink on the ore in the north drift from No. 4 crosscut, 650 level. We are also repairing the 800 level drifts.

SILVER HILL.—The north drift from the Justice shaft, 490 level, is out 735 feet; face in porphyry.

WARD SHAFT.—The joint Alpha and Exchequer south drift from the north line of Exchequer, 1800 level of Ward shaft, has been extended 26 feet during the week; total length 106 feet; face in clay and porphyry. The joint Bullion and Potosi northwest drift from the 1800 level has been advanced 25 feet during the week; total length 460 feet; face in clay and porphyry.

ALPHA.—The joint Alpha and Exchequer south drift from north line of Exchequer, 1800 level of Ward shaft, has been extended during the week 26 feet; total length 106 feet; face in clay and porphyry.

EXCHEQUER.—The joint Alpha and Exchequer south drift from the north line of the Exchequer, 1800 level, has been extended during the week 26 feet; total length 156 feet; clay and porphyry.

NAVAJO.—*Times-Review*, June 3: The stopes above the 350-foot level continue to yield about the same.

BELLE ISLE.—No. 1 west crosscut, 250-foot level, extended 13 feet. North drift, same level, extended seven feet.

NORTH BELLE ISLE.—No. 1 north drift, 400-foot level, extended 14 feet. No. 1 upraise from same extended 16 feet, and a drift started south

at this point. A winze has been started on the rich ore in the north end of No. 3 drift. The stopes generally are looking well.

NEVADA QUEEN.—Second level.—West drift from No. 1 chute advanced 21 feet, face of drift in second-class ore assaying \$26.72 per ton. South drift on the west vein has been run 15 feet; the ore is not so good as 1. st reported. North drift from same point extended 14 feet; the ore has improved; is now first-class. South drift from No. 3 shaft extended 12 feet, 2 feet of low-grade ore. Stopes continue about as last reported. Have produced during the week 152 cars first-class ore, which has been sent to the mill; average assay, \$211 per ton, and 785 cars second-class; average assay from concentrator, \$28.90 per ton.

Hawthorne District.

BONDED.—Hawthorne Bulletin, June 4: The Umattila, Denver and Bright Light mines, in Nevewest canyon, Hawthorne district, were bonded to S. L. Hanak & Co. of Salt Lake last week. The conditions of the bond were that \$5000 was to be paid within 60 days, and if not paid in that time the amount is to be \$7500. A. H. Finney, principal owner, is to work the mines for the purpose of development, in conjunction with Dave Millsaps. These mines are said to be very promising properties, and as Mr. Hanak represents large capital, it is to be hoped that he will work the mines for all they are worth.

St. Louis District.

TO STOP.—Cor. Walker Lake Bulletin, June 4: Jack Maney arrived from St. Louis district on the 20th. He shipped a carload of ore to the Selby Works, California, which will average 500 ounces silver and \$18 per ton gold. Maney & Walsh have plenty of ore in sight, but owing to the low price of silver have determined to stop work and ship no more. They have four men employed. Bob Robinson's claim adjoins Maney & Walsh's. They have struck the ledge at a depth of 20 feet. The ore is of the same character, averaging about \$300 per ton. Knapp & McNaughton, on the same ledge, are taking out ore in paying quantities. Stoner & Rickards are doing first rate on their placer claim in Tule canyon. They are averaging \$3 per day.

ARIZONA.

THE CYANIDE PROCESS.—Arizona Journal-Miner, June 4: The proposition to establish a plant in Prescott to treat ores by the MacArthur-Forrest process is beginning to take tangible shape. Two more mining deals, in which the purchase price runs away up into the upper tens of thousands, is on the tapis. T. A. Conlee continues his development work on the Johnson mine, near Stanton. The mine continues to look well as development progresses. The leaching works and smelter at Copper Basin are running regularly now, and shipments of copper are being made. About 35 men are employed at the mines and reduction plant. W. W. Horton arrived on yesterday's train from London to examine the Lone Star mine. Four other gentlemen who are also interested in a proposed deal for this property are expected in a few days. The mine is well opened up, and shows a large quantity of good ore.

NOT A FAILURE.—The statement made by a correspondent to the effect that the MacArthur-Forrest process had proven a failure in the treatment of Crowned King ore is denied. The rumor probably arose from the fact that when in readiness to put it to a test on a large scale, it was discovered that they had an insufficient supply of cyanide on hand, and they were compelled to await the arrival of an additional supply from Phoenix, which is now en route to the mine. Contrary to its proving a failure, the tests made of the ore and concentrates proved highly satisfactory, and those having the matter in charge have no doubt whatever of the complete success of the treatment of the ore and concentrates from this mine.

IDAHO.

TO START.—Hailey Times, June 2: Mr. Bailey reports that he will start up the Champlain mine and mill to-morrow. This property has lain idle for two years, owing to litigation in which the company became involved, and not to any want of merit in the mine. The mill is new and in good order. The ledge is opened with tunnels and shafts, all ready to commence stoping ore. The Champlain ought to be a success.

WOLF TONE.—The Wolf Tone was a prominent mine on Wood river in 1881; about that time it sold for \$25,000. The company worked the property, took out some money, then, having lost their ore chutes, ceased operations. Last year they failed to do the annual work, the ground being abandoned; it was relocated by John McFarlane and associates. To-day, operations will be commenced looking to the opening up of the property; four miners will be put to work. The present owners apprehend no trouble in finding the ore body.

THE SILVER KING.—Major Hyndman's success in opening the road to Sawtooth calls attention to the Silver King. During the last two years the Major has spent \$25,000 in developing this property. Success has, however, crowned Mr. Hyndman's efforts, and he now has one of the best mines on the Sawtooth range, developed and ready for the extraction of ore. The Silver King is opened by a double compartment shaft, 600 feet in depth. Drifts have been run on the 400 and 500 foot levels. The ore is high grade, giving returns of 300 ounces silver per ton and from \$3 to \$5 in gold. There is out on the dumps 2000 tons of concentrating ore of a good grade which will be handled as soon as a concentrating plant can be put in place.

THE ARGENT MINE.—Mr. Mentandon has made a visit to the Argent mine, one of the French boys' group on the Bullion divide; examined that part of the claim worked by Mr.

McLeod, the lessee, which consists of the ground between the lower and middle levels. It shows very fine ore in both levels, averaging from 4 to 15 inches of good ore.

MONTANA.

ARE WELL THOUGHT OF NOW.—Butte Inter-Mountain, June 1: There are three sections of Butte which are producing rich ore to-day, that a little more than a year ago were abandoned or neglected and not considered worth the trouble of development. Reference is made, first, to the Ground Squirrel district, just a few yards north of the Parrot smelter; second, the Olive Branch district, due west of the Colorado smelter; and, third, the Eveline, in a direct line west of the Lexington. Each of these places is producing rich ore, notably the Eveline. This property continues to turn out ore of a very high grade, there being a streak of about ten inches through the vein that carries some of the richest silver ore ever found in Butte. This rich ore is found both on the east and west ends of the claim. There are two shafts on the property being worked by separate parties.

PHILIPSBURG REPORT.—Reports from Philipsburg are to the effect that the Hope Mining Co. has a heap of trouble on its hands, and the assertion is made that it will result in tying the property up for an indefinite period within the next ten days. It is claimed that the Hope Company has knowingly, for a long time, been extracting ore from property which it does not own. Some of this property has also become valuable for real estate, and a number of suits for hearing damages are said to be pending. It is believed that the Bimetallic Extension Co. has encountered the much coveted vein. During the past week, from the north crosscut, the diamond drill penetrates two leads. One of them shows up remarkably well and has an assay value equal to the vein of the Bimetalic, of which it is believed to be an extension. Ninety-two bars of silver bullion were shipped from Philipsburg during the week.

NEW MEXICO.

TO BLOW IN.—Southwest Sentinel, June 1: Work is going on in the Anson S. mine at Ansonio, and the smelter will be blown in again about the 10th of June. A small proportion of ore from the mines at Copper Flat will be mixed with the Anson S. ore in making the charges for the smelter. The Manhattan G. M. and M. Co. has asked for bids for completing the Montana tunnel, and it is expected that a contract will be let some time next month for completing the work. M. W. Neff came in from Copper Flat last Friday and says that his copper mines there are looking fine. He discontinued smelting the ore at the Anson S. smelter for the reason that it took too much flux to treat the ore. In order to get satisfactory returns, as much iron ore had to be used as there was copper ore smelted, and this reduced the grade to such an extent that the ore could not be profitably handled there. A carload of the ore has been shipped to Pueblo. William Werney has just received returns from nine tons of ore, which was treated at the Gold Hill custom mill. The ore was from the Eagle mine and ran \$421.06. The returns show that there is less than a dollar a ton in silver in the ore. The Gold Hill custom mill is running five stamps, and if water can be obtained more will be started. John Spiller, superintendent for the Pacific Gold Co., has gone to St. Louis to attend a meeting of the stockholders of the company. The mill here has been idle for several weeks on account of the inability of the Silver City Water Co. to furnish water for it.

MOGOLONS.—Cor. Silver City Enterprise, June 2: The camp is unusually quiet, owing principally to the shutting down of the Last Chance mill on the 25th ult. There are a few idle men in camp, but they will all get employment as soon as the Maud S. is opened up and gets ready to break ore for the new mill. The winze on the Maud S. will be completed this week, probably, as the contractors are rushing things, and have but eight or ten feet more to sink. The tramway is moving along rapidly, and will shortly be completed. Its use will save handling the ore for itself. The Maud S. mill is being pushed to completion, and it is confidently expected that it will be ready for business by July 4th. The mill, when completed, will be one of the most conveniently arranged in the Territory; as all the ores from the different workings in the mine will be delivered directly into the ore bins. Two Huntington mills of 15 tons capacity each, propelled by a 100-horse power engine of the Atlas pattern, and six amalgamating pans, will produce bullion in quantities to surprise the new owners of the property. John T. Mitchell, formerly of Silver City, has charge of the mine, and is opening it up in good shape. Smith & Thomas have struck a bonanza on their Deadwood property, the ore showing free gold plentifully. They are running a tunnel in from the gulch, and will strike the ledge at 100 feet deep. They have not reached the vein yet, but it is near by, and they expect to strike it in a few days.

OREGON.

FROM THE MINES.—Eugene Register, June 1: B. F. Dorris returned Monday from a trip to Blue river mines. He reports everything going on nicely up there. There are a dozen or more men at work in the different claims in that region. In the placer mines recently discovered there are half a dozen men at work, and they appear to be doing well and seem satisfied that they can make money there. It is to be hoped that a good mill can be put up there this summer. There is evidently plenty of gold there, but there are no means now of making anything mining it.

BRIMFOOT.—Bedrock Democrat, June 3: The mining outlook in this portion of the county is more favorable than it has been for a

number of years. Messrs. Bartholomew, Rust & Co. are opening a claim on Upper Clark creek which will undoubtedly prove rich. A Barnhart is working about two miles below, and expects to take out a large amount of the precious metal. Aug. Meyer has plenty of water and a full force of men at work. He will probably do better than he has done for a number of years, and the claim has always paid well. Archie Murray & Co. have commenced on their season run. You will hear a good report from this claim as soon as they make their next cleanup.

SPARTA NOTES.—Mr. Samuel Palmer has made a rich discovery of quartz on Little Baldy mountain. Mr. Lee, of Pine Valley, is hauling mining timbers to the mouth of Maiden gulch, on Powder river, for Clark & Kennedy. Their mine is showing up well. We understand that Mr. A. Tarter has sold his half interest in the Crystal Palace mine to a gentleman from Portland. Did not learn his name. No doubt Mr. Jones will also sell his half.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 31, 1892.

476,180.—PROTECTING BUNOWAYS OF BARRELS—M. Anthony, Berkeley, Cal.

475,972.—CARBURETER—E. B. Badlam, San Francisco.

475,974.—TWO-WHEELED VEHICLE—J. A. Bilz, Pleasanton, Cal.

476,039.—SWIMMING EQUIPMENT—P. Curran, Hoquiam, Wash.

476,040.—LEG ATTACHMENT FOR SWIMMERS—P. Curran, Hoquiam, Wash.

476,043.—WATER SUPPLY SYSTEM—J. W. Fisher, Palouse, Wash.

475,762.—SPINDLE NUT—Frazer & Brown, National City, Cal.

475,853.—BOOT OR SHOE—G. E. Hadlund, Portland, Or.

475,859.—GRINDING MILL—L. D. Harding, Colfax, Wash.

475,963.—HOISTING APPARATUS—J. W. Kinsman, San Francisco.

475,964.—FINOEA BAR—M. N. Laufenburg, Stockton, Cal.

474,875.—INDICATING FUNNEL—I. W. Lord, Cucamonga, Cal.

475,967.—OIL GAUGE FOR LAMPS—T. A. McGovern, Bolinas, Cal.

475,968.—WEIGHING DEVICE—D. W. McLaughlin, San Leandro, Cal.

475,965.—CAR AXLE—D. M. Miller, Fairfield, Cal.

476,064.—SAFETY LOCK FOR HAMMERLESS GUNS—R. L. Palmer, Tacoma, Wash.

475,827.—HORSE BOOT—J. Summers, San Francisco.

475,971.—SNAP HOOK—Frank White, Pomona, Cal.

476,109.—HOASE CONTRAILINO DEVICE—D. T. Woodman, Bloksburg, Cal.

The following brief list by telegraph, for June 9, will appear more complete on receipt of mail advices:

California.—San Francisco, Joseph H. Magney, cash balance; Fred W. Vaughan, wheel cultivator; Anthony N. Klein, letter box; Thomas Barnett, broiler and toaster; Alexander J. McAdam, wick adjuster for lamps; Oakland—Alva M. Stetson, amalgamator; Claudius H. Mitchell and R. M. Veitch, bicycle tire; E. Oliver, paper-holder. Los Angeles—Frank W. Kringling, touch-regulating device for pianos; Joseph Gunder, perpetual monthly calendar. Fresno—Horace H. Taylor, surgical instrument. Angels Camp—James Tulloch, concentrator; Quincy, Wm. H. Leck, educational apparatus.

Oregon.—Ashley Bancroft, Portland, traveling bag; Otto J. E. Beeseler, Mount Angel, warehouse gang-plank; Otto Van Ostrom, Portland, dam.

Washington.—Charles S. Terpeuing, Prescott, suspender brace; Geo. A. Miller, Colfax, well-boring and prospecting; John N. Lewis, Conlee City, rail joint.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SNAP HOOK.—Frank White, Pomona, Los Angeles Co. No. 475,971. Dated May 31, 1892. The object of this invention is to provide a strong, simple, neat, economical and generally effective snap hook. The construction, which is economical, is such that sand or dirt may escape from the tubular bolt instead of being retained to impede the action of the spring. A pivotal link or ring saves wear on the leather or rope.

CAR AXLE.—David M. Miller, Fairfield, Solano Co. No. 475,965. Dated May 31, 1892. This improvement in car axles consists in dividing the axle near the center and in a peculiar sleeve or coupling by which the two parts are held together and allowed to rotate independently of each other. The double cone-shaped sleeve, with the inclosing conical clamping collars and the pin and socket connection of the abutting ends of the axle form a powerful supporting truss, which overcomes any objection of lack of strength in the structure. Either of the wheels which are fixed to the opposite ends of the axle, can turn independent of the other, as when passing around curves.

TWO-WHEELED VEHICLE.—John A. Bilz, Pleasanton, No. 475,974. Dated May 31, 1892. The object of this invention is to provide a simple and durable vehicle which, on account of its lightness, may be properly termed a

"speeding cart," and in which, by the peculiar arrangement of parts, and especially of the axle, the horse may be hitched up close and brought back as far under the driver as possible, and the driver's seat may have all the necessary spring for comfort.

HOISTING APPARATUS.—James W. Kinsman, S. F. No. 475,963. Dated May 31, 1892. This hoisting apparatus is one of those devices designed for unloading coal and other material in bulk from ships and depositing it in more or less distant pockets or bunkers. It is intended to provide an apparatus in which a minimum amount of manual labor is necessary, and by which the material may be rapidly conveyed to the pockets or bunkers located at any suitable distance.

SKID FOR LOADING AND HANDLING LOGS. David Evans, E. H. Percy and Bethune Perry, Eureka, Humboldt Co., Cal. No. 475,511. Dated May 17, 1892. The invention relates to the general class of log-handling machinery, and particularly to the class of devices for loading logs on the sawmill-carriage and handling them thereon. The object of the invention is to provide an apparatus or machine for loading or handling logs in sawmills and other places by power, said object being accomplished by a novel arrangement, construction and application of parts, in such a manner as to provide a simple, convenient and easily operated machine for this purpose, which will handle the logs from the mill bed or deck to the saw carriage, load them quickly on to the carriage, will adjust them rapidly thereon to a proper position in relation to the head blocks, and will turn them down on the carriage, when so desired, into a new position and readjustment for sawing.

GAS BURNER.—Geo. I. Ewers, San Francisco. No. 475,012. Dated May 17, 1892. The invention relates to an improvement in gas burners or to an attachment for gas burners, the object of which is to automatically shut off the flow of gas, when the flame from any cause becomes extinguished, while the stopcock remains open. It consists of a supplemental valve, a means for opening said valve and retaining it open to permit the gas to flow when the stopcock is turned on to allow the gas to be lighted, a means by which said valve is released from its holding-catch, but still retained in its open position while the gas is burning, and a means by which it is closed after the gas is extinguished. By the construction shown, the inventor provides a supplemental, automatic-closing valve which will always act independently of the main cock and after the gas is extinguished. If this cock be left open either accidentally or otherwise, no escape of gas through the burner can take place after the burner has cooled.

FINOEA BAA.—M. N. Laufenburg, Stockton. No. 475,964. Dated May 31, 1892. The usual construction for finger-bar for headers and similar machinery is either to secure the guard directly into a wooden beam or to a beam which is made of angle iron or steel. Both these constructions are open to objection—in the first, because any undue strain caused by the point of one of the guards striking the ground is apt to split the bar, and in the second because such strain will break the guard and bolt-holes and make it difficult to replace it. In this invention, Mr. Laufenburg uses a peculiar composite bar.

OIL GAUGE FOR LAMPS.—Thos. A. McGovern, Bolinas, Marin Co. No. 475,067. Dated May 31, 1892. This oil gauge is especially adapted for lanterns or lamps having opaque sides. It consists of a vertical transparent tube, open at each end, a casing within which the tube is secured, and by which it is attached to the inner side of the lamp reservoir opposite an opening through which it may be inspected, and a slide for closing said opening at will. Lanterns which are used by railroad men and others often cause annoyance by going out from lack of oil when away from a source of supply. This invention will allow the ready inspection of the quantity of oil contained in a lantern, so that the person will be enabled to take a lantern which is full and also to know when it is necessary to replenish without the necessity of taking off the top.

Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

ARIZONA MINES.		Hale & Norcross.		Dr. Cr.	
Dr. Cr.		Dr. Cr.		Dr. Cr.	
Crocker.....	\$2,770	Justice.....	—	—	14,363
Poor.....	1,252	Kentuck.....	—	—	3,663
Pearless.....	1,946	Lady Washington.....	—	—	6,195
Silver King.....	508	— Mexico.....	—	—	1,168
Weldon.....	49	Oce Dental.....	—	—	12,194
BODIE MINES.		Ophir.....		16,957	
Bodie.....		Overman.....		17,949	
Bulwer.....		Potosi.....		14,343	
Mono.....		Sage.....		4,806	
Standard.....		Seg. Belcher.....		6,256	
Summit.....		See pion.....		8,935	
Syndicate.....		Sierra Nevada.....		8,805	
COMSTOCK MINES.		Silver Hill.....		6,000	
Alpha.....		Union.....		—	
Aldo.....		Utah.....		1,643	
Andes.....		TUSOAKORA MINES.		—	
Belcher.....		Belle Isle.....		12,662	
Bonanza.....		Columbia.....		1,480	
Best & Belcher.....		Commonwealth.....		28,446	
Bullion.....		Don Monte.....		21,239	
Caledonia.....		Diana.....		6,706	
Challenge.....		Grand Prize.....		7,533	
Chollar.....		Independence.....		150	
Confidence.....		Navajo.....		20,604	
Con. Oal. & Va.....		Nevada Queen.....		6,001	
Con. Imperial.....		North Bullion.....		29,000	
Con. New York.....		N. Commonwealth.....		7,341	
Crown Point.....		MISCELLANEOUS MINES		—	
Eschewer.....		Eureka.....		—	
East Sierra Nev.....		Holmes.....		42,871	
Gould & Curry.....		Mt. Diablo.....		—	

NOTE.—Con. Cal. & Va. has bullion on hand amounting to \$15,705, and further shipments to arrive. Navajo has 163,715 in unsold bullion and \$12,800 due on pumping account. Hale & Norcross has \$7547.46 in unsold bullion.

MECHANICAL PROGRESS.

The Cast-Iron Pipe Trade.

Mr. Peter D. Wanner, the chairman of the Mellert Foundry and Machine Co. of Reading, Pa., read the following interesting paper recently before the Reading Board of Trade:

"The use of cast-iron pipes grew out of the wants of water works about the beginning of the present century. There were 16 of these works in the country prior to the year 1800, and 87 in the year 1850. Up to this point of time the pipe trade had developed slowly and was not regarded as of much importance. After 1850, however, the large and rapid increase of water and gas works made the demand for pipe proportionately large, giving new life and vigor to the industry. About this time the Mellerts began the manufacture of cast-iron pipe in this city. The panic of 1857, as well as the Civil War, retarded the trade very considerably. During the war only a few works of either gas or water were constructed, and it was not until after 1865 that the business in this line again commenced to improve, and increased to such an extent that even the panic of the seventies did not appear to affect it during the year 1878. Owing probably to an overbuilding of water and gas works, and the high price of pig iron then ruling, the trade remained quiet until the summer of 1881, when it became very active, and remained large and profitable until the end of 1887. These were six years of unprecedented prosperity for the pipe manufacturers of this country, but with them disappeared the profits of the trade.

With net earnings for 1887 away up among the thousands, we had to be contented at the winding up of the following year with a few hundred dollars. Since then the best possible management was required to hold what had been previously accumulated and meet current charges, and should we take into account the wear and tear of machinery and fixtures, necessary repairs and improvements that should have been made, but were postponed, excepting only cases of absolute necessity, it would be entirely safe to say that no money has been made.

If any pipe foundry can show a better record I should like to hear from it, and yet during all this time the demand was large and the number of water and gas works increased to an aggregate of 2200 for water and 1200 for gas, having a mileage of probably not less than 50,000, or twice around the world.

The trade was also increased of late years by a demand from railroads, etc., for sewer, drainage and culvert purposes, but owing to the great number of new pipe foundries constructed throughout the South and West, and the increased capacity of the older ones, the demand fell short of the supply. In other words, we have had overproduction, plain and simple.

All the new foundries built since the boom of the eighties could well have been spared and the money saved to the investors; but men learn by experience only.

View the situation as we may, it clearly means that this once prosperous and profitable trade will become uncertain and of doubtful tenure, and that location, equipment and management will be the essential elements tributary to the success of the pipe foundries in the future, North and South. It is, in my opinion, however, absurd for this or other iron industries in the South, no matter what their financial strength may be, to presume that they can either obtain or hold any great portion of this trade. It is true they have closed up a number of furnaces and pipe foundries throughout the North, of which many will never run again, yet there are others which will meet every cut in price and remain in the trade. Having cut to cost and below, their next move must necessarily be on wages as a last resort, and the inevitable. Thus this abnormal stimulation of the pipe and iron industries, beyond the wants of the South and of the country at large, is bringing discomfort and ruin to many once happy homes throughout the North.

CONVERSION OF MECHANICAL INTO ELECTRICAL ENERGY.—It has been found that to produce a given electromotive force and current a certain expenditure of power is indispensable, since electricity itself is but another form of motion, which requires power to produce it. It is also found that whether we seek to produce one volt and a current of 1000 amperes or 1000 volts with a current of only one ampere, the power expended will be the same; so, for the convenience of calculation, the term *watt* has been introduced to indicate the amount of electrical energy contained in 1 volt x 1 ampere. One horse power of mechanical

energy, which is equal to the work done per minute by one pound falling through 33,000 feet, or by 33,000 pounds falling one foot, is equivalent to 746 watts. This means that if we could convert directly, without any loss through friction or any other imperfection, one horse power of mechanical energy into electrical energy, we should obtain 746 watts. As we can subdivide the watts into amperes and volts at our discretion, so we could at will obtain either 746 amperes at one volt pressure, or one ampere at 746 volts pressure, in exchange for our horse power, or any two factors of volts and amperes which multiplied together produce 746. In practice, the best modern dynamos waste in conversion from 2½ to 5 per cent of the energy put into them as motive power; in other words, it is possible to obtain from 95 to 97½ per cent of electrical energy from a dynamo absorbing 100 per cent of mechanical energy to drive it.

A Paper Barrel.

An English concern has begun the manufacture of what is practically a paper barrel, and in which manufacture any waste material of a fibrous nature, such as cotton, paper and leather waste, etc., may be used, thereby turning into money much that has heretofore been discarded. The material to be used is first sorted over and then reduced to a fine pulp by being passed through a pulping machine, which consists of a beater operating in a circulating tank of water. As fast as the pulp assumes a proper degree of consistency, it passes from the pulp machine to the floor below, where it is received by an accumulating tank in which is placed the apparatus for forming the bodies of the barrels. In this tank the pulp is transformed from a semifluid to a solid mass by impingement with an endless traveling blanket which picks up the pulp and allows the water to drain off through its pores. On the upper side of this blanket, and in contact with it, are placed at intervals the cylinders upon which the barrel bodies are formed.

These cylinders are provided with sheet metal cores, which are arranged with allowance for expansion and contraction, and upon the surface of these cores the pulp is deposited from the blanket. As the pulp accumulates upon the upper cylinder, it is compressed by means of a pressure roller, under the blanket, and in a direct line with each cylinder. After a lapse of, on an average, four minutes, a sufficient accumulation of pulp has been made on the cylinder and the latter is withdrawn, metal core and all, leaving the barrel body ready for drying. Hot air prevails in the drying-room and is circulated by a blower, and in this room the barrel remains for a day, after which it is dampened and shaped under hydraulic pressure from a hydraulic main, to which the water is admitted under the previously mentioned pressure. This barrel is subject to this pressure until it has been set to the desired form, when it is then dried and finished. The making of similar barrels has been tried in this country with lack of success, in a measure owing to the difficulty experienced in removing the newly formed body from the core. This difficulty is overcome, however, by the ingenious contracting core.

Paint for Exposed Metal.

Red lead, so largely used by engineers, is an oxide of lead, usually in the form of bright red powder, which is not affected by water, but evolves the smell of chlorine when boiled with hydrochloric acid, and is slowly converted into chloride of lead. Dilute nitric acid only partly dissolves it, leaving a brown powder. On account of its durability it is frequently used as a priming coat, often the only coat used on iron-work. Care should be taken that no salt is present, otherwise a chemical action commences, blisters are formed, and the lead is reduced to a metallic condition. It has been proposed to substitute for red lead a pigment obtained from a sulphide of antimony, termed antimony vermilion, which is sold in a state of very fine powder, without taste or smell, and which is insoluble in water, alcohol, or essential oils. It is but little acted on by acids, and certain engineers state that when ground in oil it acquires great intensity or brightness of color, that it has a good body, is unalterable by air or light, and may be freely mixed with white lead. Black paints made from the residual products obtained in distilling coal and shale oils are largely employed for rough work. They combine readily with drying oils, and give an intense and handsome black, which is at the same time very economical. Native oxide of iron has of late years supplied us with a paint which possesses many of the good qualities of red lead, without its incon-

veniences. Oxide of iron paints are most effective and durable paints to use on iron, as they have no tendency to change or affect the surface of the metal. An analysis of one of these paints gives peroxide of iron, 68.95; aluminous earth (clay), 1.48; burnt clay, 29.57; total, 100. The purple brown oxide is a hydrated peroxide of iron.

Under equal volumes, iron paint covers more than those from lead; mixed with one-third of white lead it forms an excellent mastic, similar to that made from red lead, and which becomes very hard after drying for some time. As the iron oxide of paint resists a strong heat, it is advantageously employed for painting parts of machines and boilers. The so-called anti-corrosive paint is made of equal parts by weight of whiting and white lead, with half the quantity of very fine sand or road dust, with colors at pleasure. The mixture being made with water can be used as a water color, but it is usually applied as an oil paint. The preparation of oil recommended for this purpose is 12 parts by weight of linseed oil, raw; one part boiled linseed oil, and three parts of sulphate of lime, the whole well mixed. One gallon of oil thus prepared is used to seven pounds of the paint. Paints containing silica have been used for both wood and paint; they give a hard substance which is very durable; it is stated that when mixed with proper oils they will resist the action of salt water or acids better than iron or lead paints, that they cover well, and that in case of wood they form a considerable protection against fire.—Gas Fitters' Review.

SCIENTIFIC PROGRESS.

Sirius.

Andrew Grieg, Tayport, Scotland, contributes to the Astronomical Society of the Pacific (San Francisco) the following paper on "Sirius":

This is the most brilliant star in the heavens, and is sometimes called the leader of the host of heaven. It lies under the beautiful constellation of Orion, and a little to the left hand. Its splendor is so great that it has been perceived at mid-day with a telescope of half-inch aperture, and it has even been seen with the naked eye in broad sunshine. It is one of the stars whose parallax is unknown, and consequently its distance. The recent determination of its parallax by Dr. Gill, Royal Astronomer at Cape of Good Hope, shows Sirius to be much nearer than it was formerly believed to be. Its distance is equal to about nine light-years. Dr. Huggins, the eminent Spectroscopist and President of the British Association, tells us that the nearest star is so far off, that if it were approaching us at the rate of 100 miles per second, a whole century of such rapid approach would not do more than increase its brightness by the one-fortieth part. Photometric observations, combined with its ascertained parallax, show that Sirius emits from 40 to 60 times the light of our sun.

The old astronomical methods cannot tell us if the stars are coming directly toward us or going directly from us. The spectroscopic here comes to our aid, and enables us to find the motion of a star in the light of sight. It can measure the speed of approach or of recession of a heavenly body with very great accuracy—probably to about a mile per second. The early spectroscopic observations at Greenwich seem to show that Sirius recedes from us at one time with a velocity of 22 miles per second, and at another time is coming toward us at the same rate, as it moves in an elliptic orbit.

Certain minute changes in the motions of this brightest of all stars induced Bessel, the famous astronomer of Königsburg, to suspect the existence of some, as yet unseen, companion sun, whose disturbing influence might account for the unusual displacements. Auwers, another astronomer, calculated the probable elements of this unseen disturbing mass. Ultimately, a companion star was discovered by Mr. Alvan G. Clark (maker of the object glass for the great Lick telescope), by means of the refractor of 18½-inch aperture made by himself. This excellent instrument now belongs to the Observatory of Northwestern University. The companion, though at least one-tenth as heavy as Sirius itself, can only be seen under favorable conditions, for its light is not more than one-12,000th part of that emitted by Sirius.

ELECTRICITY AND WHITE LEAD.—Ammonium acetate is used for dissolving the litharge in the production of basic carbonate of lead—the so-called "white lead" of commerce. The solution is ordinarily used over and over again, and in course of time becomes impure through taking up considerable quantities of copper—an im-

purity in the litharge. One of the latest improvements employs carbonic acid gas for removing every trace of metal from the acetate, but another improvement, which is said to be even more effective, is to pass through the solution an electric current, electrodes of carbon being employed. In another application of electricity to white lead making, the metallic lead itself is decomposed in an acid electrolyte into an oxygen bearing salt of the metals; the saturated solution being then neutralized, and the salts contained in it being converted into hydrated lead carbonate. The latter is precipitated by the introduction of carbonic acid gas.—Electric-al Engineer.

Improvements in Photolithography.

Some improved photomechanical processes have just been patented by Dr. E. Albert, of Schwabing, near Munich. The first improvement relates to the construction of line plates used for "breaking up" the photographic image. These plates are themselves photographs of gratings, having from five to eight diagonal opaque lines to the millimetre. The lines are ordinarily of uniform breadth and opacity throughout the plate; but Dr. Albert, by giving a slight movement to the lens, causes these lines to blur or shade off at each side from a narrow central black band to a comparatively broad band embracing all gradations of shade down to an edging of very slight density. If (for an example) this plate is to be employed in photolithography, it may be placed on a sensitive surface in a copying camera, with a negative of the subject to be photolithographed. In the high lights, practically the whole width of the graduated hands will be effective in shielding the sensitive surface. In the shadows, on the other hand, only the central or blackest parts of the lines will be effective. Hence, in the finished lithograph, the diagonal lines, represented by white paper, will be broadest in the high lights, and narrowest in the deep shadows, with, of course, intermediate gradations of thickness—which is doubtless a very valuable result.

Another device patented by Dr. Albert, is the disposition of the lines on photochromic printing blocks in directions making considerable angles with one another. All the lines upon each plate are parallel *inter se*, but make an angle with those upon the other two plates of about 30°. This obviates the formation of those striking patterns (due to distinction between optic and pigment mixtures of colors) that are seen when color plates with parallel rulings get slightly out of register.

ANOTHER OIL GAS PROCESS.—An oil gas process invented by C. H. Wilder, and now in operation at Chelsea, Mass., has in the way of apparatus three cylindrical retorts, each five feet long and 14 inches in diameter, inclosed in brick work. The first is an open cylinder, affording an unobstructed passage. The second and third are supplied with a series of diaphragms between two and three inches apart, through which and over and around which the gas is obliged to pass on its way to the cooler and holder. About eight feet beyond the third retort stands the cooler and hydraulic main. The process, in brief, consists of the introduction of the crude oil into the first retort from a tank in which a percentage of water of a certain temperature has been forced to facilitate the flow of the oil. In this retort it is immediately volatilized. Almost simultaneously a volume of air is injected into the retort from a blower. This is also heated to the same degree of temperature as the vapor from the oil, and both readily assimilate. The air, acting as a pressure, forces the gas through a five inch pipe into the second retort. Here it passes through and over the series of diaphragms in the second and third retort, where it is similarly treated. In this retort the gas is thoroughly fixed. The diaphragms in the second and third retorts, as well as all the pipes and cylinders, are perfectly carbonized—a fact which prevents the gas from coming into contact with any heated metal, consequently there is no destruction or loss in transit. Through a six-inch pipe the fixed gas is carried from the third retort to the purifier and cooler, and hence into the holder outside the building, where it is stored for use.

INSECT ILLUMINATION.—The Secretary of the Smithsonian Institute, Prof. Langley, has been recently experimenting with Cuban fireflies, with view to discovering the manner in which the illumination they emit is generated. He says that the light that they give is the "cheapest" in the world—produced, that is to say, with the least heat and the smallest expenditure of energy—and he believes that a successful imitation of it would prove a most profitable substitute for

gas or electricity. The insects are beetles two inches long, and belong to the family of "snapping bugs," so called because when one is laid upon its back it snaps itself into the air with a clicking sound. The secret of the light this firefly gives is as yet undiscovered. Apparently it is connected in some way with the mysterious phenomena of life, and chemists and physicists have sought in vain to explain its origin. On each side of the animal's thorax is a luminous membranous spot, and these flash at intervals, so that the Cubans put a dozen of the insects in a cage together, and so obtain a continuous illumination bright enough to read by. This light is accompanied by no perceptible heat, and is seemingly produced with almost no expenditure of energy. How great an improvement it represents upon all known artificial lights can be imagined when it is stated that in candle light, lamp light, or gas light, the waste is more than 99 per cent. In other words, if they could be so obtained as not to throw anything away, they would give nearly 100 times the illumination which they do afford. Even the electric light is mostly waste.

THE NEW UNIT, KELVIN.—The English Board of Trade has just decided that the commercial unit of electricity formerly known as the "Board of Trade unit" is hereafter to be called a "kelvin." The unit itself is one kilowatt hour, that is, 1000 watt hours, and its new name is the present title of the well-known Sir William Thomson, now Lord Kelvin. Some people object to naming units, says *Electrical World*, but they fail to give any good reasons and are quite ready to make good use of such units when they find out the time, paper, ink and patience it saves to replace a sentence by a single word. Their unfavorable criticisms need not, therefore, be considered. No one can object to the well deserved honor done to Sir William Thomson by thus naming an important electrical unit; it seems a pity, though, that the name "kelvin" was chosen in place of "thomson," as that eminent gentleman has gained his world-wide fame under the latter name, and many will never know who the present name, kelvin, refers to. But the unit has been named by parties who have doubtless considered all the points, and our best plan is to join hands with our English friends, and adopt with them this new name in the same way that they accepted our unit, the henry. The coming Congress in 1893 would do well to officially adopt this name and stop all petty disputes which may arise between others who think that their views must be the only correct ones. Those who object may still continue to write the euphonious name "kilowatt hours;" nobody but they themselves and their stenographers are the losers.

ELECTRICITY.

Electro-Magnets.

A very important factor to be considered in the construction of an electro-magnet, says *Electrical Age*, is the length of the coil and of the core, as compared with the diameter. It is generally conceded that the maximum or outside diameter of coil should not exceed three times the diameter of the core, and while it has been said that the best results will be obtained by having the length of the core six times its diameter, there does not appear to be any universal reason for such a proportion. In a bar-magnet, however, where there is a desire to employ but one pole only, and get rid of the effects of the other, a decided advantage is to be gained by using a core of much greater proportional length, and should there be any restrictions as to the amount of wire to be used, fewer layers can be wound over a long piece of iron than would be over a shorter one. In this way the distance between the iron and the wire would be reduced, and having the same resistance the number of lines of force would consequently be correspondingly increased. If the same proportion were to be maintained between the respective diameters of the lengthened core and its coils, and the gauge of the wire so increased as to maintain a constant resistance and constant number of turns, the polar strength developed close to one end of the core will vary as the square of the length of the core—that is, if the core is not lengthened so extensively as to permit a leakage of the lines of force at the sides of the coil. This limit will vary with different qualities of iron in accordance with the relative permeability, or in other words, capability of conducting lines of force.

The above description treats only of electro-magnets in which the wire has been evenly wound its entire length; but for some

purposes it is preferable to vary the method of winding.

We will suppose, for example, that it is desired to construct a bar-magnet which shall develop close to its extremities a very powerful field, and yet at the same time not exert any force at a comparatively greater distance. In such a case it should have the wire coned up near the ends; that is to say, it should have a larger layer of wires over the ends, the number gradually decreasing toward the middle and with few or none being wound over the central position of the core. As a rule, the wire should not, at any point be wound more than three times the diameter of the core. In such a magnet the lines of force will be powerfully developed near the ends and have but little tendency to leak out. On the other hand, much smaller curves will be made than would result from an equal length of wire wound evenly along the entire length of the core.

STREET CARS.—While it is true that the propulsion of street-railway cars by electricity, may, after five years experience be pronounced a success from the point of view of public accommodation and convenience, it must nevertheless be admitted that from the street-railway manager's standpoint this success cannot truthfully be regarded as an unqualified one. While electric power has unquestionably demonstrated itself to be an advance, not merely upon the use of animals, but upon the use of any other power whatsoever which has been proposed for the purpose, its practical application has been accompanied by many serious drawbacks. An individual who had just emerged from a protracted litigation once remarked that the only property the lawyers had left him was his post-office address, and it has been said with equal truth that in the conversion of a horse railroad into an electric line, oftentimes the sole item remaining of the original property is the franchise. The first electric motors were found to be far too light for the work they were required to do; when these were placed by heavier ones the original cars proved too weak to stand the strain; then the new cars were so heavy as to be ruinous to the track, and so it was necessary to completely reconstruct that, and so on. For the first year or two the cost of repairs and maintenance of motors, and the losses incurred by breakdowns, constituted a formidable item, but this having been overcome by increasing the strength and weight of the motor machinery and the adoption of the so-called gearless design, the trouble has broken out afresh—this time in the track. The destructive effect upon the rails of some of the methods of mounting motors now most in vogue is little short of appalling.—*Engineering News*.

WEAVING BY ELECTRICITY AT BLACKBURN.—A Blackburn paper (England) states that the experiment of weaving by electricity was last week for the first time tried with perfect success, at the loom works of Mr. Henry Livesey, Limited, Greenback, Blackburn. The works are illuminated by electric light, the electricity being generated by a large dynamo, and taking advantage of this installation a motor has been fixed in one of the upper rooms by Mr. Thomas Barton, of Blackburn, and drives the identical loom which secured to Mr. Livesey the medal at the Paris Exhibition. This loom, of which there are hundreds of facsimiles running in Blackburn mills, has what is known as a 44-inch reed space, and with the electric power is being worked at the rate of 210 picks per minute. The motor is large enough to drive a greater number of looms, so that a higher speed than this might be attained if desired. Of course there would be no advantage in driving a large number of looms by electricity, but where there is an installation of electricity for lighting purposes, a few looms may be worked to advantage by electricity. Again, any one having the electric light laid on to his house might, with the aid of a motor, run a couple of looms.

AN ELECTROMAGNETIC LIGHT COIN DETECTOR.—Messrs. Napier & Son show at the Crystal Palace Exhibition an electromagnetic light-coin rejector for the use of bankers or mints. The coins are pushed in succession from the balance pan on to a knife-edge, and according as this knife-edge is at the right-hand limit of its range, or the left-hand limit, the coin, when pushed on it, tilts off to the "light" channel or the "full weight" channel as the case may be. The right or left position of this shifting knife-edge is determined by an electric contact made by the balance beam. This brings an electromagnet into action. The coins are run through the machine at the rate of about 60 per minute by the action of turning a handle.

GOOD HEALTH.

How Leprosy is Spread Wholesale.

Much alarm has been expressed of late at the recent rapid spread of this loathsome and fatal disease in India, in many British Colonies, the Sandwich Islands, Norway, and elsewhere. A correspondent of *Discovery* says:

The following appear to be undoubted facts. 1. The disease is hereditary, the descendant of a leper almost invariably being attacked by the disease, though it seldom appears until the age of 15, and sometimes long after. 2. The children of apparently healthy parents, who a few years after giving them birth have become lepers, nearly always become lepers themselves, showing that the disease is long resident in a person, and can be transmitted to his or her children before it makes its appearance. 3. Attendants of leper hospitals very rarely contract the disease, and have no fear of handling the patients, so long as they have no cuts on their own fingers. 4. It is rapidly spreading in several countries, in a manner that cannot be accounted for by inspection, and in a manner unknown in the history of the disease, prior to this century, and in ways that cannot be accounted for, either by contagion or infection. 5. No well-established cure has been discovered for it. 6. It resembles syphilis in many of its characteristics, and can be propagated in a manner similar to that disease, but this accounts for but a very small part of its late abnormal spread. 7. It can certainly be propagated by inoculation, and there are many acknowledged instances in which it has been spread by ordinary arm-to-arm vaccination, the lymph having been obtained from the arm of some person just beginning, unknown even to himself at the time, to suffer from leprosy.

What inferences can we gather from the foregoing data? 1. That a man may be an actual and potential leper and capable of being a propagating center of the disease years before there are recognized leprosy symptoms. 2. That many are thus born potential lepers. 3. That there is no known way of diagnosing these from others. 4. That the disease can be by inoculation, or arm-to-arm vaccination be spread from potential lepers to other persons.

On grounds like these it has been suggested, and we think it is highly probable, that arm-to-arm vaccination is the true cause of the rapid spread of leprosy and that it should be totally suppressed by law in those countries at least where leprosy exists.

The Measles Bacillus.

Dr. Canon and Dr. Pielicke of the Moabit Hospital, the former of whom was one of the first to demonstrate the presence of the influenza bacillus in the blood, have now turned their attention to measles, and it is reported that they have been so far successful that they have been enabled to demonstrate the presence of a specific bacillus in connection with this disease.

This discovery has naturally attracted considerable attention; for although *a priori* we should expect measles to be the result of the action of such a germ, we have hitherto been unable to associate it directly with any such causal agent. In 14 patients they have succeeded in finding what they assume to be a specific bacillus in the blood, in the expectorations, and in other secretions. This bacillus is stained with methylene blue in the same way as the influenza bacillus, the coloration being specially intense at the ends. The different individuals differ considerably in length, being from one-three-thousandth to one-one-thousandth of an inch. Its characteristics are said to be different from those of any other bacillus known, and artificial cultures have already been obtained. If once we are enabled to study the life history of this organism, there seems to be a possibility that we shall be able to take some efficient steps in the protection of children against this disease. The further observations on this organism and on its power of producing the disease will be awaited with additional interest from the fact that it appears to be so like the influenza bacillus in its distribution, and also to a certain extent in the effect it produces, in spite of the fact that it is very different in structure and appearance from the influenza organism.—*Lancet*.

TREATMENT OF RHEUMATISM.—It seems as if everybody is complaining of rheumatism nowadays, young and old, rich and poor. Science, ever ready with something new to alleviate the sufferings of mankind, has not failed in this direction, and salol is now the remedy extensively used for rheumatism. The *Medical Times and Register*

says: "Therapeutically, the anodyne property of salol is exhibited in the cases that are rheumatic in source." The first triumphs of salol were won in the treatment of acute rheumatism, excelling, as it apparently does, all other remedies in its power to abate and lessen fever. If all the conditions be propitious, by the end of the second and third day, fever and joint pain and swelling will have disappeared. Salol has a further use, in that it is antiseptic, and excellent results have been obtained from it when used as a disinfectant for the bowels in cases of cholera, typhoid fever, etc. In connection with the cure of rheumatism, it may be stated that of late years massage treatment has found great favor with rheumatic patients. In practicing massage, the fingers are usually moistened with some sort of oily preparation, and for this purpose nothing better can be used than lanoline. Many physicians consider this vastly preferable to vaseline or any other preparation, and its use has invariably been attended with the greatest success.

USEFUL INFORMATION.

COLORING BRASS.—The following method is given for coloring brass: One hundred grammes of carbonate of copper and 750 grammes of ammonia are introduced in a decanter, well corked, and shaken until solution is effected. There are then added 150 cubic centimeters of distilled water. The mixture is shaken once more, shortly after which it is ready for use. The liquid should be kept in a cool place, in firmly closed bottles or in glass vessels, with a large opening, the edges of which have been subjected to emery grinding and covered by plates of greased glass. When the liquid has lost its strength, it can be recuperated by the addition of a little ammonia. The articles to be colored should be perfectly clean. Especial care should be taken to clear them of all trace of grease. They are then suspended by a brass wire in the liquid, in which they are entirely immersed, and a to-and-fro movement is communicated to them. After the expiration of two or three minutes, they are taken from the bath, washed in clean water, and dried in sawdust. It is necessary that the operation be conducted with as little exposure to the air as possible. Handsome shades are only obtained in the case of brass and tombac—that is to say, copper and zinc alloys. The bath cannot be used for coloring bronze (copper tin) and other similar metallic alloys.

SELENIUM.—Selenium is a nonmetallic element, and, in some respects, resembles sulphur and tellurium. As used for electrical purposes, says the *Optician*, it is crystalline in structure, brittle and black. Its most remarkable property, however, is the variation of electrical resistance under light rays. This property of selenium was discovered in 1875 by Willoughby Smith, a prominent English electrician. It is an extremely poor conductor, its resistance, according to Sylvanus Thompson, being very much greater than that of copper. Under the influence of light, however, its resistance varies directly as the square root of the illumination. The "selenium cells," recently constructed by Prof. Alexander Graham Bell and Mr. Sumner Tainter, consisted of narrow strips of selenium placed between the edges of broad conducting plates of brass. By this method of construction, a reduction of transverse resistance and a large amount of surface for exposure to the action of light was secured. In the dark this cell had a resistance of 300 ohms, and when exposed to sunlight the resistance fell 50 per cent, or to 150 ohms.

SAFETY LAMP.—The *Colliery Guardian* notes an invention patented by Mr. W. Allott and Mr. T. Fairies, of Chapeltown, the object of which is to protect the eyes of miners while using safety lamps. This it does by preventing the light from the lamp from shining directly upon the workman's eyes. The inventors claim that this can be done while focusing the rays upon the precise spot required. A shield of enamel is made to cover about three-eighths of the surface of the glass cylinder that protects the flame. The enamel subdues the rays of light, and at the same time acts as a reflector.

A NEW use has been found for diamonds, in assisting marksmen in their shooting. The cut stones are fixed in the front and back sights, and it is said that they enable the gunner to take a quick and correct aim, even when the light is bad. The brilliants are so fitted that as soon as the gun is brought to the shoulder, the rays in the gems assist alignment, and the eye takes aim without the least hesitation.

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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Mining Machinery—Bucyrus Steam Shovel & Dredge Co., Bucyrus, Ohio.
 Mining Machinery—Risdon Iron & Locomotive Works, Assessment Notice—Terliff G. M. & M. Co.
 Assessment Notice—The Butte King Mining Co.

See Advertising Columns.

The Cyanide Process.

The announcement that we should shortly publish a special edition of the MINING AND SCIENTIFIC PRESS relating to the MacArthur-Forrest or cyanide process, has already resulted in orders for several hundred extra copies, showing the wide interest felt in all details concerning this method of the treatment of ores. It is our intention to publish this special edition on July 2d, and the matter for it is now in course of preparation. We should be obliged to correspondents who will send us in any personal experiences with the process. The object of the special edition is to gather everything of interest on the subject for handy reference. With this in view some articles which have already appeared will be reprinted, but most of the matter will be fresh in nature. Diagrams and plans will be given for arranging a plant on this system, together with such details as will be of interest and value to metallurgists and miners. Orders for copies of this edition should be sent in at once.

A new flume 45 miles long will be built in Fresno county. Its purpose is to reach the Birmingham tract of timber, containing 10,000 acres, belonging to a large lumber company of Michigan. This flume will interfere with none now in operation, but will develop the new region beyond Crane Valley, one of the wealthiest bodies of pine in the Sierra Nevada range.

An Anti-Debris Convention.

As announced in the PRESS of last week, an Anti-Debris Convention occurs Friday, June 10th, at Sacramento, when certain farmers and citizens intend protesting against the passage of the Caminetti bill, on the ground that the farmers are opposed to impounding dams; that they have never made any concessions to the miners; that the miners have violated their pledges by continuing illicit mining; and that the position of the farmers has been misrepresented in Congress and elsewhere.

It is not worth while to reopen the discussion on this debris question in its general features. It has been a subject of controversy for many years. The courts decided against the miners, and they had to accept the decrees, whether they wanted to or not.

But, after a time, it was found that the gold from the mines was needed in California. Many of the towns became depopulated, and the hydraulic mining industry, with all the capital invested, was practically wiped out. Public opinion became more favorable to the miner when it was found he was willing to impound the debris which had done the damage, and the farmer could have no cause of complaint if that were done.

At the State Miners' Convention in January last, acknowledgment was made of the damage done, and it was conceded the business of hydraulic mining could not continue unless the debris was kept out of the rivers and off the farming lands. The legislature of California had asked Congress to settle this question, and it appointed a Board of Engineers to examine the matter. This Board reported that, under certain conditions, dams could be built which would restrain the debris. With this report as a basis, the miners appealed to Congress for aid. The representatives of the farming counties present at the convention, when they saw the miners were earnestly endeavoring to do something to prevent the damage from their operations, lent their assistance. A memorial and resolutions were adopted and submitted to Congress. The farmers were not asked to give up any rights under the decrees of the courts, and gave up no rights. The valley people simply withdrew active opposition on finding the miners were willing to do what was right.

On this basis the Caminetti bill was drawn. It has been reported back by the committee and is on its way to passage. It is unjust on the part of the valley people to oppose it now under the circumstances. It permits the miners to build dams under Government supervision, and the miners must pay for them by returning three per cent of gross yield from mines benefited. No one pays the expenses of the dams except the miners.

This whole thing has been brought about by certain individual miners continuing to work when they should not have done so. This was foreseen by the Miners' Association, but that body is powerless to prevent it. The Anti-Debris people have not been able to prevent it, and the Government has not been able to. The Miners' Association officially asked the miners to stop mining, and have repeatedly urged compliance with the request. That is all they can do.

As to misrepresentation of the farmers' position, that is a mistake. The resolutions of the Miners' Association, published elsewhere, show how they feel on that subject.

It is to be hoped that the representatives of the valley counties, who were at the Miners' Convention, will attend the one at Sacramento and explain to the gentlemen assembled that the miners have tried, and are trying, to do what is right; and also explain that the farmers have not been misrepresented. As to the utility of impounding dams, the engineers having reported favorably upon them for the purpose specified, any lay opinion from farmer or miner is of

no moment. But it will be detrimental to the interests of this State should the Sacramento convention do anything to prevent a settlement of this long-fought debris question, now that Congress has it in hand.

Turn the Mills Over to the Mines.

In compliance with the request of the Mining Stock Association, the Potosi Silver Mining Company of the Comstock lode has kindly furnished the stockholders of the company with the car sample assays. The secretary of the company, Mr. Chas. E. Elliot, with that zeal for the interests of the stockholders of the company, for which he is noted, has taken the trouble to obtain, for these stockholders, the car samples showing the value of the output during the month of April, as well as the month of May. This is very commendable, and the example set by Mr. Elliot should be followed by other secretaries, as the month of April is the first month of the second quarter of the year, and, with this data, stockholders in the various companies producing ore can easily see what is being done.

An analysis of the report of the working of the ore for this company during the month of April does not make a very creditable showing for the Nevada mill, which reduced it.

It is well known among expert millmen that the ore of the Comstock can be worked up to 90 per cent of the pulp assay, but in the working of the Potosi ore, the mill returned but 78 per cent of this pulp assay. It is presumed that the "three-pan annex" attached to this mill, and which was so thoroughly advertised in the Hale & Norcross case, must be supplied with grist to grind, and the 12 per cent difference, which went to fatten the slimes and concentrates, went to fatten the output of that part of the mill. A statement of the working of the Potosi mine is given below, and from it the stockholders in that property can see where \$4433.50 of their profits went.

POTOSI MINE.			
	Car Sample.	Battery Sample.	
April 9.....	\$26.30	\$24.38	
April 16.....	31.12	27.52	
April 23.....	22.89	23.25	
April 30.....	22.76	21.82	
Average.....	25.77	24.24	
May 7.....	25.57	25.34	
May 14.....	23.86	24.65	
May 21.....	22.62	22.18	
May 28.....	18.98	21.19	
Average.....	22.75	23.34	

APRIL WORKINGS OF POTOSI MINE.	
Tons worked.....	1,478
Bullion returned.....	\$27,810.46
Cost of reduction, \$7 per ton.....	10,346.00
Net proceeds.....	17,464.46
Average assay value of pulp.....	24.18
65 per cent of pulp assay is.....	15.71
Gross average returned per ton.....	18.81
Net average returned per ton.....	11.81
Per cent saved of battery assay.....	.78
Should be returned 90 per cent of battery sample value (\$35,826.72).....	32,244.05
Amount actually returned 78 per cent.....	27,510.46
Amount kept by the mill for month of April \$4,433.59	

It is a pity that the directors of this company persist in entrusting ore to a mill with such an unsavory record as the Nevada mill, which is under the management and control of the parties who have been found guilty of conspiring against and defrauding the Hale & Norcross Mining Company. Such acts can lead to but one termination, and that is judgment criminally and civilly for the full amount which may be lost to the stockholders through the passive assent of these directors to the looting of the mine.

There apparently is but one way to relieve the ore-producing companies on the Comstock from the attacks and looting of the millmen, and that is by turning the mills over to the mines.

No honest millman and mine manager will object to this and the sooner it is done the better.

As long as the owners of the mills control and pay the assayers at the mines, just that long will there be a question as to assays.

It is notorious that these assays can be manipulated to suit the mill owners, and there is no certainty that it is not now done, as it is positively known that assayers have had instructions to "strike off" a certain number of "points" as suited the convenience of the millman.

These little irregularities can all be corrected by turning the mills over to the mines. It should be done at once.

Another point of interest in this analysis, is the fact that for April there is only a difference of 5.9 per cent between the car sample and the battery assay. In May the average battery assay exceeds the pulp assay 59 cents. In view of the testimony given in the Hale & Norcross case that there was a difference of \$10 per ton between the car sample assay and the battery assay, these figures are very significant. The fact that the mill took 26.88 per cent of the pulp value of the ore is also a matter of interest to the stockholder. The average pulp assay of the ore was 24.18 while the net average return to the company was 11.81, showing a loss of \$13.96 per ton between the time of the delivery of the ore to the mill and the return of the bullion to the company. Where did this go?

The secretary of the company should make an explanation of this loss to the shareholders of the Potosi Company.

Miners' Association Resolutions.

On Friday last the Executive Committee of the California Miners' Association met and passed the following resolutions:

WHEREAS, At a mass meeting at Colusa on May 30th certain resolutions were adopted in reference to hydraulic mining and its effects, denouncing the Caminetti bill, now favorably reported on and pending in Congress, stating that the position of the farmers and citizens of the valley has been misrepresented at Washington and elsewhere, and that the farmers have never admitted in any shape that they were willing to make concessions, but have stood and still stand squarely on the decision of Judge Temple of the State Court and Judge Sawyer of the United States Circuit Court; and

Whereas, A convention of the valley counties has been called for June 10th at Sacramento to consider these resolutions and take action on the Caminetti bill; therefore be it

Resolved, by the California Miners' Association, That we regret this action on the part of misinformed citizens attending the mass meeting at Colusa, since this Association has never represented that the farmers have abandoned any rights under the decrees of the courts, but, on the contrary, have endeavored to act in harmony with them in preventing further damage from mining debris, by advocating and urging the plans suggested by the Government engineers appointed by Congress to inquire into this question and suggest plans for stopping the damage.

Resolved, That we have never represented that the farmers had abandoned their position toward hydraulic mining debris, nor asked nor expected them to suffer hydraulic mining to go on without suitable restrictions where there was liability of damage, but have asked their assistance on legislation which would prevent the damage complained of in the past.

Resolved, That we have urgently requested all miners to desist from illicit mining, and sincerely regret that any individuals have continued such work, and that we reiterate the sentiment expressed in the resolution passed by this body on January 30, 1892, in relation to this matter, viz.: "That it is the sense of the California Miners' Association that such persons as may start their monitors in the spring at places where damage is likely to result to streams or adjacent lands shall receive no aid or countenance in the future from this Association."

Resolved, That we consider that the Caminetti bill now pending in Congress will give relief to both sides in this controversy in that only those miners licensed will be permitted to mine, and only those can be licensed who are in a position to deposit the debris from their mines behind the impounding dams to be erected by and under the supervision of the Government engineers.

A Conference Committee was appointed as follows, to meet with the convention at Sacramento on June 10th to represent the California Miners' Association and to explain to the convention the position the miners maintain in regard to hydraulic mining: J. H. Neff (Chairman), Edward Coleman, Charles G. Yale (of the MINING AND SCIENTIFIC PRESS), John Hays Hammond, S. K. Thornton, Marion Biggs, W. C. Ralston and Judge Niles Seales.

THE business portion of Jimtown, the famous mining camp at Creede, Colo., was destroyed by fire on Sunday morning. The flames were started by an explosion of coal oil. In a short time the fire burned through rows of frame buildings for a distance of a mile. Many houses were blown up with giant powder in an attempt to stop the fire, but to no effect. The entire area between the school section and Upper Creede is now a mass of smoldering ruins. The loss is fully \$1,000,000, and there is not over \$150,000 insurance all told.

Chinese Silver-Lead and Copper Mines.

In presenting the conclusion of Mr. Ellis Clark's paper on "The Progress of Mining in China," maps are given of the Je-Hol silver-lead district and the Ping-Chuan-Chao copper district. The mines of Yen-Tung-Shan, with some others, constitute the Je-Hol mining district, opened in 1887 under the direction of Prof. John A. Church. The mines had previously been worked by the Chinese themselves without outside direction. After reaching depths of 100 to 150

The smelting at Yen-Tung-Shan is still carried on in the Chinese way, an account of which may be found interesting. This metallurgical process consists of three operations—roasting, smelting with litharge to concentrate the silver in a bar of lead, and cupelling this bar of lead for silver. The roasting is done in an open heap, the ore being kept in place by loosely piled adobes. A comparatively high heat is produced, which results in driving off a portion only of the sulphur and melting the remaining sulphuret of lead into a matte.

fuel, is an exceedingly neat operation—sn oblong pile of slightly moistened wood ash, 2 feet long, 18 inches wide and 9 inches high, is made, and the test cut out with a hoop and pressed down with the foot. Twenty catties of lead are placed in the test, and half-bricks laid at intervals along the edge, with adobes covering them and the test, thus forming a muffle. A cone of charcoal is then built over the muffle, and this charcoal is used as the centering of a dome, built of mud and straw, which is plastered on the charcoal till it has a thick-

concentrating mill, designed and constructed by Frazer & Chalmers, equipped with boilers and a Corliss engine, a Blake coarse crusher, a Sturtevant mill, a Buchanan fine crusher, rolls, one three-compartment jig, two two-compartment jigs and a rotary buddle. The smelting works consisted at first of a 15-ton water-jacket furnace, and subsequently of a 40-ton furnace, with Baker blower and attached engine, dust-chambers and stack of boiler-plate and a cupellation plant.

The Ping-Chuan-Chao copper mines are situated 160 miles north-east of Tientsin, at the point marked on the route-map as Chu-Tzu (signifying "office"). The controlling feature of the topography is a valley 2300 feet above sea level, descending and broadening southward, and forking toward the north and west into a number of ravines which lead up to a divide, 2600 feet high, between two branches of the Lan-Ho. The mines of Hsiao-Liang-Hsi and Ta-Liang-Hsi (Little and Great West-Mountain) are on the western slope of this divide. Bounding the valley on the northeast and southwest are limestone hills, whose summits reach an elevation of 3000 feet.

The copper ore is found exclusively in the decomposed limestone belt, between the granite and the amygdaloid, in pockets and small seams somewhat after the nature of a stockwork. In the Yuen-Li shaft it occurs as a contact deposit between the granite and the limestone. The ore is a silicate of copper, containing some carbonate and occasional copper pyrites. It is smelted in a 36-inch water-jacket furnace with iron and lime fluxes which are found in the neighborhood, and with a coke carrying 20 per cent of ash.

The pig copper is refined by a native process, which consists in extracting the iron and other impurities by means of small quantities of lead in a hearth lined with Pekin anthracite. A hole measuring three feet cube is dug and lined with brick; the cavity is filled with anthracite-culm in which a basin is hollowed out and coated with a paste made of anthracite powder and water. A dome is then built over the basin



feet, the Chinese experienced difficulty with water, and were drowned out every rainy season. The vein is entirely in limestone slates, no ore having been found in the schists. Besides the main vein there are several flat or bed veins. The mine is now opened by a three-compartment shaft and gangways. The vein is about three feet wide with a much narrower pay streak running from 12 to 18 ounces of silver per ton where there is zinc blende; but with the galena it will run from 300 to 500 ounces per ton. The ore mined by the Chinese carries 28 to 57 per cent of lead and 54 to 300 ounces of silver per ton. Washings from waste ore carry little or no lead, but 16 to 80 ounces of silver.

The smelting is performed in two low crucible-furnaces built of clay, 2 feet 6 inches high, 12 inches inside diameter at the top and 18 inches at the bottom. The blast is supplied by a Fenghsiang or wind-box, worked by two men. The furnace-charge is made up of two piculs (133 pounds) of roasted ore, one picul of rich silver-slag from a former operation, and 60 catties (1½ pounds) of litharge either purchased or obtained from a previous cupellation. The product of one operation is only 58 catties of silver-lead, as a large portion of the lead and a considerable percentage of the silver go off in heavy clouds of smoke.

The cupellation, though performed on small quantities and being extravagant in

ness of two inches. The charcoal is then ignited; the lead oxidizes into litharge and is absorbed by the test, while more lead is added through the front opening; fresh charcoal is also added through a hole in the top of the dome, and after eight hours the silver brightens and the cupellation is complete. The two operations of smelting and cupellation consumed 200 catties of ore, 100 catties of rich slag and 60 catties of litharge, and yielded 58 catties of lead containing 31 taels, or 41 ounces, of silver.

The foreign management, under the energetic direction of Prof. Church, erected boilers and a hoisting engine supplied by the Union Iron Works of San Francisco, and subsequently built a 50-ton coarse-

with long crucibles serving as columns, and with lumps of anthracite, slate and clay. The hearth is rapidly dried and pig copper melted in the basin by means of wood fuel and blast from a wind-box. The fining is accomplished by constant stirring of the molten copper with an iron rod and the addition of small quantities of lead. The operation lasts from six to eight hours, whereupon the copper is ladled out and poured into molds, the ingots being immediately dumped into water. The copper is sufficiently pure for ordinary commercial purposes; it shows a fine silky fracture and is covered with deep rose-red oxide, so highly desired by purchasers. The native process is described only as a matter of interest.

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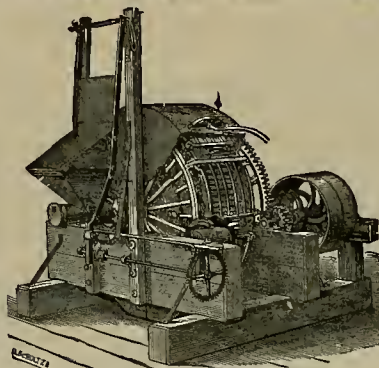
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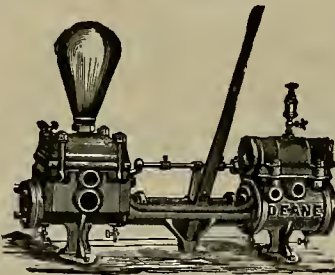
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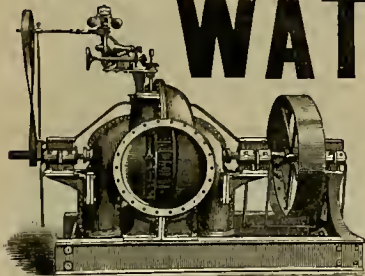
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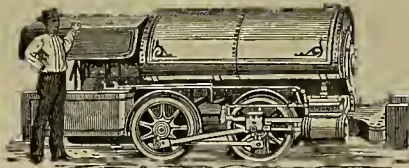
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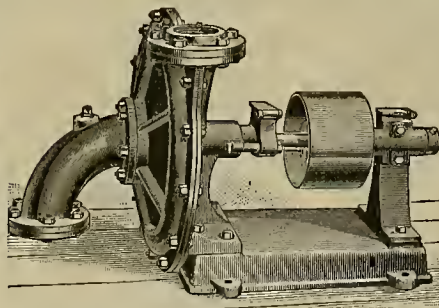
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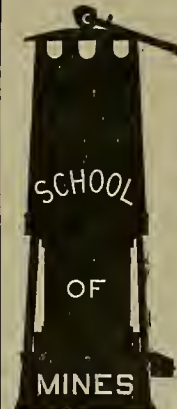
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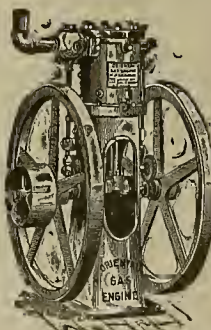
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, June 9, 1892.

As harvest work progresses, under favorable crop-maturing weather, the feeling of confidence in the future becomes more pronounced. With the return of confidence trade expands and capitalists are less disposed to hoard funds. It is now stated that accommodations are more readily secured from banks and outside capitalists. It is claimed that unless the price of wheat advances there will be large quantities warehoused and funds raised by hypothecating the receipts. Even with this large drain realized, the money market will still be easy. We are informed that considerable money has come and will come from Europe for investment on this coast; the high rates of interest ruling here make such investments quite profitable. The European money market is reflected in the following excerpt from a leading exchange in London: "The Bank of England rate remains at two per cent, and the Bank of France has lowered its figures from three per cent, at which it has stood for 3½ years, to 2½ per cent. The Bank of France now holds \$6,455,640 in gold, or about three times as large as the stock held in the Bank of England. In our own market, day to day loans have been offered at one-quarter to one-half per cent, and the discount rates have ranged from three-fourths to 1½ per cent, which are almost unprecedentedly low quotations. They show what a vast amount of money is awaiting employment, if only confidence could once more be effectually restored." The New York money market is reported easy, with a plethora of funds on hand. Persons offering gilt-edged security can be accommodated at a low rate of interest. A New York exchange, under date of June 4th, says: "The strength of the bond market, resulting from the glut of money and consequent low rates of interest, is the most important feature of the week. Purchases made on Saturday alone amounted to \$1,650,000, principally in Reading issues at an advance, and for the week the aggregate approached \$3,000,000. The abundance of money was again demonstrated by about \$5,000,000 further increase of the bank reserves, so that the surplus now amounts to \$24,594,000. The June disbursements will add to the volume of money seeking investment. Now that gold shipments have ceased and Europe is buying bonds instead of selling them, the financial horizon is supposed to be more cheerful."

The *Railway World* of New York, in referring to the June disbursements by the different railway companies, says: "While the amount of the interest and dividends to be disbursed will appear small in comparison with those of the coming month (July), yet they reach the amount of \$28,339,882, the par value of the bonds on which interest is due being \$57,738,556, while the par value of the stocks on which dividends are payable is \$152,972,296. The June disbursements of the character indicated, and the amounts on which payments are to be made, compare as follows:

	1891.	1892.
Bonds.....	\$50,967,571	\$657,738,556
Interest.....	17,782,603	18,118,176
Stocks.....	444,424,608	452,972,296
Dividends.....	9,978,237	10,221,705
Total.....	\$25,760,840	\$28,339,882

The low rate of interest no longer becomes a cause for surprise in the light of the above large disbursements, which are quite small when compared to the total sums which will be disbursed in next month.

SILVER—The markets at home and abroad show a steady appreciation. The advance has every evidence of being based on legitimate business requirements. With a continued improvement it is quite probable that a speculative demand will set in. If this demand does set in the large short interest abroad will undoubtedly run to cover, and, bidding against themselves, high prices must inevitably follow. A most remarkable change has been and is steadily growing, in the views of financial men and leading financial writers, regarding silver. The *Daily Indicator* of New York, which is an accepted authority on Wall street, has standing in large type a demand that silver be remonetized. The *New York Iron Age* which has been a strong gold bug organ, in its issue of June 2d editorially says: "The prevailing sentiment with reference to the free coinage of silver has undergone considerable change since the issue was pressed most vigorously upon Congress. It will be remembered that last autumn Robert Giffen was quoted in a London dispatch as authority for the statement that by February of 1892 the silver crisis so long impending in the United States would culminate in disaster. The prediction doubtless added to the apprehension already existing among foreign investors and financiers, so that American securities held in Europe were viewed with distrust. However that may be, large amounts were sent home for redemption in gold, giving increased volume to the eastward flow of the yellow metal from this country, despite the balance of trade was largely to the credit of this country on account of the extraordinary exports of grain to supply the deficiencies in Europe. It is exceedingly instructive to observe at this time that scarcely a ripple of disturbance remains, and that with a sense of restored security purchases of American stocks and bonds on European account are resumed on a liberal scale, forming a conspicuous feature in Wall street. One immediate consequence is that the rates of sterling exchange are so much advanced that exports of gold from this side are no longer profitable, and the feeling in the market is that as the season advances the European demand is likely to broaden rather than diminish." The above is strong evidence that a silver scare has no foundation in fact and that now with more radical legislation in favor of the metal the United States will not be a sufferer.

MEXICAN DOLLARS—The market is stronger, at around 7½ cts. The last steamship which left for China took out the following: For Hongkong, \$318,142, and for Yokobama, \$120,000.

QUICKSILVER—Receipts the past week, 603 flasks. The market is fairly active, with a good demand ruling.

BORAX—Exports by sea the past week aggregate 4030 cts, to New York. The market is steady, with

a fair consumption demand ruling here and at the East.

LIME—Receipts the past week, 7209 bbls. Receipts the past week were the largest in any one week in the history of the trade. The market is fairly active for building and other purposes.

PIG LEAD—The market holds fairly steady. The East reports a moderate business and a fairly firm market, with holders not disposed to shade prices.

PIG TIN—The market is firm here and at the East. It now looks as if the corner which is being run at the East will be a success. This opinion strengthens as silver appreciates. New York mail advices continue to report "bulls" buying all that offered on spot or to arrive.

PIG IRON—The market is reported slightly firmer but not quotable higher. The consumption is said to be larger than at any time within the history of the trade. Eastern and English advices are more favorable. It looks as if bottom prices for this year had been touched.

COPPER—The market shaded off slightly the past week, but the undertone to the market has considerable strength. *Iron Age* reports the New York market as follows: "All accounts go to show that the consumption in the manufacture of electrical supplies continues on a large scale, and that considerable quantities are being used for other purposes." English cables indicate that before long all differences, looking to controlling the output of all the mines, are liable to be settled at an early day.

COAL—Imports the past week: Comox 4300 tons, Nainaimo 4042, Tacoma 4007, Seattle 1223, Departure Bay 4070, Newcastle, N. S. W., 6668, Sydney 5070. Total 30,180 tons. The tonnage on the way from Australia is slowly increasing, but it aggregates about 40 per cent less than was on the way at the corresponding date in 1891. While the market is not quoted higher, yet there is a very strong tone, which is likely to result in better prices as the season advances.

Mining Share Market.

SAN FRANCISCO, June 9, 1892.

Mining shares the past week were lifeless and generally depressed up to Tuesday, when Savage began to show more life, which resulted in the shares selling up to \$3 on yesterday. While this activity is regarded on it is hard to say, unless it be the old trick of leading the public into another trap; but whether the pool will succeed remains to be seen. Times are somewhat changed now, and it may be that insiders can not run their little confidence game so successfully. There was a time, and that not far back, either, when a few dollars or political influence controlled courts and juries. With voters at large awakened to a keen realization that courts of justice are, as a rule, that only in name, but rather are, generally, courts for legalizing robbery, a change will set in when even poor, but honest persons, will be able to have wrongs righted. With this change, conspiracies by those elected to offices of trust in any incorporated company, can and will be punished by having the guilty sentenced to serve a term of years in the penitentiary and at the same time made to pay back funds misappropriated through fraud or otherwise.

To bring trustees or directors up with a round turn, it is only necessary to have ten or more shares put in the name of the person who wishes to bring suit. The person having ten or more shares standing in his or her name in the books of any company, can determine in writing that the laws under which the company is incorporated, be conforming to, and the directors or trustees failing to have it done makes each director or trustee liable in the sum of \$1000 to the person, which sum can be secured by bringing suit. This is the decision of the Supreme Court of this State. It is good law and will stand, even if there be one or more judges who hunt for ways and means to reverse the ruling of the highest court in this State. There is no other way by which a person can make more money than by bringing suit against the directors of mining companies which fail to have their superintendents furnish weekly letters fully conforming to the law under which the company is incorporated.

Not only is that the present little spurt in the market is due to the mill rings, which for years have been looting the Comstock mines, realizing the full extent of the position in which they are placed, and have determined to secure at least two-thirds of the shares of the mine marked for looting. To get the shares, they are now in the market as buyers. If this should be the case, then were to outsiders who hold shares after the ring has bought all the shares wanted, for it will be only assessments and low prices afterward. The mill ring controlling a mine sending ore to a mill, can have poor rock selected for assay, and the "little joker" at the mill will take care for the ring, of any and everything going above what would be a reasonable difference between the car sample assays and battery assays. It looks as if the public will not have its share of bullion from all ore milled, until the mills are owned or leased by millig companies. Until this time arrives, outsiders had better let mining shares alone for an investment. If they deal in them, let it be only as a gamble, and sell when a good profit is in sight. Take the shares in any leading mine on the Comstock, and they are at a discount after the ring has bought all the shares, and the others are a buy when around fifty cents a share.

It has been many years since the shares in the following mines sold as low as they did this week: Chollar, Potosi, Bullion, Alpha, Exchequer, Challenge, Confidence, Yellow Jacket, Belcher, Overman, Union and Sierra Nevada. In several of the above evidence there is very little to be seen, and the work is being developed either for looting or for showing up, whichever shall pay the best, but in either case the above shares have already been a good buy when they were as low as they are now. The strong depression is done for good reasons, and in time, the shares will sell for more money, how much, each buyer must determine for himself, but "a profit is a profit" and he who does not take it should, as he will, be a heavy loser in the end.

The watch cry should now be "The mines must own or lease the mills." If a mine is to be honestly worked, the directors would favor such a proposition. Another good watch cry is, "Turn all rascals out." The directors of the Hale & Norcross Mining Co. should see that the lawyers who so successfully and fully prosecuted the late suit against the old directors of that company, and the owners of the Nevada Mill and Mining Co., are handsomely paid for their services. Ten per cent or even more of the sum which will be recovered, is not even too small. It was a fight against money, and the long months of getting evidence and litigation attests this fact, and W. T. Baggett and any associate he might have had, should be well paid. This is a duty the directors owe to shareholders in the Hale & Norcross mine. The winning of this suit marks a new era in the history of the Comstock mines, and should result in honest mine management, let the rings fight against it as hard as they may.

M. W. Fox has been granted his application to be

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	No.	AMT.	LEVIED.	DELINQ. AND SALE.	SECRETARY.
Belcher S M Co, Nevada.....	14	250	May 17, June 21, July 12.....	C. L. Perkins, 331 Pine	
Bullion M Co, Nevada.....	38	250	May 24, June 17, July 19.....	R. R. Grayson, 331 Pine	
Butte King M Co, Nevada.....	8	50	June 4, July 11, Aug 2.....	W. C. Lewis, 723 Market	
Challenge Con M Co, Nevada.....	11	250	May 15, June 20, July 12.....	C. L. McKee, 331 Pine	
Chollar M Co, Nevada.....	8	50	May 28, June 7, July 27.....	C. E. Elliott, 309 Montgomery	
Diana M Co, Nevada.....	8	80	May 3, June 10, June 30.....	R. Grayson, 331 Pine	
Elipsee M Co, California.....	1	50	April 23, May 25, June 15.....	C. Tum-Suden, 402 Montgomery	
Golden Prize Con M Co, Nevada.....	5	250	Feb 23, June 8, June 29.....	C. D. Bennett, 327 Market	
Gould & Curry M Co, Nevada.....	59	520	June 7, July 12, Aug 4.....	K. Durbow, 309 Montgomery	
Gray Eagle M Co, California.....	28	50	April 14, May 23, June 14.....	A. W. Barrows, 303 California	
Justice M Co, Nevada.....	50	150	May 2, June 6, June 27.....	R. E. Kelly, 419 California	
Mexican G & S M Co, Nevada.....	35	250	May 16, June 21, July 12.....	C. E. Elliott, 309 Montgomery	
Ophir M Co, Nevada.....	55	500	June 3, July 7, July 27.....	E. B. Holmes, 309 Montgomery	
Oranby M Co, Nevada.....	50	50	May 19, June 23, July 11.....	G. D. Edwards, 414 California	
Siskiyou Cons Quicksilver Co, California.....	4	150	May 14, June 17, July 8.....	E. E. Stone, 336 Pine	
Summit M Co, California.....	12	50	June 27, July 31, July 29.....	M. E. Welles, 309 Montgomery	
Terkoff G M & M Co, California.....	3	100	May 31, July 8, July 29.....	W. J. Guratt, 338 Pine	
Utah Con M Co, Nevada.....	15	250	June 7, July 11, July 29.....	A. H. Fish, 309 Montgomery	
Yellow Jacket M Co, Nevada.....	31	250	May 9, June 14, July 13.....	W. H. Blauvelt, Gold Hill	

MEETINGS.

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Bodie Con M Co, California.....	Annual.....	H. D. Walker, 309 Montgomery.....	June 20
Foundry & Machine Co, California.....	Annual.....	T. W. Pew, 310 Pine.....	June 16
Great Western M & M Co.....	Annual.....	F. E. Lutz, 330 Pine.....	June 13
Homestake M Co, Dakota.....	Annual.....	I. C. Stamp, 379 Montgomery.....	June 14
North Belle Isle M Co, Nevada.....	Annual.....	J. W. Pew, 310 Pine.....	June 22

LATEST DIVIDENDS.

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, California.....	10	L. Osborn, 319 Montgomery.....	April 23
Champion M Co, California.....	10	T. Wetzel, 310 Pine.....	May 10
Cons Cal & Virginia M Co, Nevada.....	50	A. W. Havens, 309 Montgomery.....	Aug 17
Cons Cal & Virginia M Co, Nevada.....	25	H. P. Rupp, 101 Sansome.....	Jan 5
Great Western Quicksilver M Co.....	25	A. Halsey, 328 Montgomery.....	June 8
Pacific Coast Borax Co, California.....	1 00	A. H. Clough, 230 Montgomery.....	June 10
Standard Cons M Co, California.....	10	J. W. Pew, 310 Pine.....	Apr 26

made complaint in the suit against the directors of the Chollar Mining Co.

With the death of W. S. Hohart, the late directors of the Hale & Norcross Mining Co. and the owners of the Nevada Mill & Mining Co., who were defendants in the suit, may find it hard work to get bonds to appeal from the judgment rendered by Judge Hubbard. Each defendant will have to give bonds covering double the sum which he must pay in the event of the other codefendants not being able to pay any part of the judgment. Alvinza Hayward, to appeal, has to give a \$2,000,000 bond. H. M. Levy a \$2,000,000 bond, K. P. Harmon a \$420,000 bond, and so on through the list. Total bonds, about \$10,000,000.

Advices from the Occidental Mining Co. report that the ore which is being milled pulp over \$24 a ton. One hundred tons of ore are to be run through an arrastre, an invention by Superintendent Kinkade. Good results are confidently looked for.

The reported fight for the control of the Savage mine is said to be made by a mill ring, so as to get hold of the 15,000 tons of ore extracted but not milled while the mine was controlled by the Levy-Harmon combination.

H. M. Levy is vice-president of the Seg. Belcher-Midas M. Co.

News from the outside mines is of a very encouraging character. Favorable news from the Comstock mines is hard to get verified. There is no doubt but the work in one or more of the mines is of a most important character, but the mine managers are not prepared to have it leak out, owing to the share market not being in position. If the rings can get the public to buy shares and pay assessments, then no ore will be shown up, but if the public will not buy, then ore will be shown up and dividends, if necessary, be paid. It is the old, old story.

Eastern Metal Markets.

New York, June 9.—The following are the closing prices the past week

	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	40 7-16	88 1/8	4 20	21 70
Friday.....	40 1/8	88 1/8	4 20	21 85
Saturday.....	4 1/8	88 1/8	4 20	21 85
Sunday.....	4 1/8	88 1/8	4 20	21 85
Tuesday.....	4 1/8	88 1/8	4 20	21 85
Wednesday.....	4 1/8	88 1/8	4 20	21 85

Silver to-day easy at 89 cts. Copper is dull, as is lead. Pig tin continues strong. Quicksilver is steady. Borax meets with a good demand. Antimony is slow but steady.

San Francisco Metal and Coal Market.

ANTIMONY.		STEEL.	
Per lb.....	@ 14	English, lb.....	@ 18
Refined, in car lots.....	@ 8	Antony tool.....	@ 84
Powdered, do.....	@ 8	Greta, lb.....	@ 84
Concentrated, do.....	@ 7 1/2	Do, Dist. tool.....	@ 84
All grades jobbing at advance.		Do, Pick & Hammer.....	@ 41
		Machinery.....	@ 41
		Toe Calk.....	@ 41
COPPER.		TINPLATE.	
Bolt.....	@ 22	B. V. steel grade.....	@ 6 00
Sheeting.....	@ 22	14x20, spot.....	@ 6 00
Ingot, jobbing.....	@ 14 1/2	Tharcoal, 14x20.....	@ 6 00
Do, wholesale.....	@ 13 1/2	Do, roofing, 14x20.....	@ 6 00
Fire Box Sheets.....	@ 22	Do, do, 20x28.....	@ 12 00
IRON.		COAL.	
Bar, base.....	@ 3	Spot job.....	@ 23
Norway, base.....	@ 4 1/2		
PIO IRON.		SPOT FROM LARD—PER TON.	
Eglinton.....	@ 23 00	Wellington.....	@ 25
Glenbrook.....	@ 24 00	Greta.....	@ 25
Am. Soft, No. 1.....	@ 26 00	Nansimo.....	@ 25
Oregon Pig.....	@ 27 00	Gilman.....	@ 25
Puget Sound.....	@ 27 00	Seattle.....	@ 25
Clay Lane White.....	@ 24 00	Coos Bay.....	@ 25
Langdon.....	@ 23 00	Cannel.....	@ 25
Thorncliffe.....	@ 24 00	Egg, hard.....	@ 14 00
Gartsherr.....	@ 24 00	Cumberland, in sacks.....	@ 15 00
Barrow.....	@ 23 00	Do, bulk.....	@ 14 00
Carzofel.....	@ 23 00	Do, do.....	@ 15 00
CHROME IRON ORE.		SCOTCH SPLIT.	
Per ton.....	@ 10 00	Brynbo.....	@ 7 50
		West Hartley.....	@ 8 00
LEAD.		TO LOAD—PER TON.	
Pig.....	@ 4 1/2	Australian.....	@ 6 00
Bar.....	@ 6 1/2	Liverpool Steam.....	@ 6 50
Sheet.....	@ 6 1/2	Do, Scotch Splint.....	@ 6 50
Pipe.....	@ 6 1/2	Cardiff.....	@ 7 00
		Lehigh.....	@ 12 00
		Cumberland.....	@ 13 00
		Egg, hard.....	@ 12 00
		West Hartley.....	@ 7 50
SILVER.		COKE.	
Home trade, pr.....	@ 42 50	English, to load.....	@ 9 00
For export.....	@ 36	Do, spot, in bulk.....	@ 10 00
		Do, in sacks.....	@ 12 00

Complimentary Samples.

Persons receiving this paper marked, are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber please show the paper to others.

CALAVERAS COUNTY miners will hold a Miners' Convention at San Andreas, June 11th. A committee has been appointed on permanent organization.

Assessment Notices.

THE BUTTE KING MINING COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Butta County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of June, 1892, an assessment (No. 4) of five cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, 723 Market St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 11th day of July, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 2d day of August, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
W. C. LEWIS, Secretary.
Office, 723 Market St., San Francisco, Cal.

TERKOFF G. M. AND M. COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Amador County, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the 31st day of May, 1892, an assessment (No. 8) of one cent per share was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, 308 Pine St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 6th day of July, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the 29th day of July, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors,
W. J. GURNETT, Secretary.
Office, 308 Pine St., San Francisco, Cal.

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FOR SALE CHEAP.

One 80-H. P. Taylor Beck High Speed Engine, in use but four months; 11x15—replaced on account of size by 200 H. P. Ball Engine, at power house of Santa Cruz Electric Railroad. In first-class condition.

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No. 4 DOW, 5 1/2" steam, 3 1/2" water, 8" stroke.
No. 6 DEANE 7 1/2" steam, 5" water, 10" stroke.
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Table of Lowest and Highest Sales in
S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 17.	WEEK ENDING May 24.	WEEK ENDING June 1.	WEEK ENDING June 3.
Alpha.....	.90	.40	.30	.35
Alta.....	.70	.75	.75	.35
Andes.....	.60	.65	.60	.65
Bolcher.....	1.10	1.42	1.45	1.10
Belle Isle.....	.15	.25	.25	.10
Boat & Belcher.....	2.20	2.50	2.30	2.10
Buttlin.....	1.05	1.35	.85	1.20
Boile Con.....	.35	.40	.35	.40
Bulwer.....	.20	.45	.45	.40
Commonwealth.....	.20	.25	.25	.20
Con. Va. & Cal.....	4.45	4.45	4.45	3.85
Challenger.....	.65	.45	.55	.35
Chollar.....	.85	1.05	.89	.85
Confidence.....	2.40	2.20	2.25	2.00
Con. Imperial.....	.15	.05	.05	.10
Calcutta.....	.25	.25	.25	.25
Crown Point.....	1.20	1.35	1.15	1.20
Crocker.....	.15	.25	.30	.15
Del Monte.....	.15	.25	.30	.15
Eureka Con.....	.30	.35	.30	.15
Excelsior.....	.30	.35	.30	.15
Grand Prize.....	.15	.25	.25	.15
Gould & Curry.....	1.35	1.40	1.30	1.45
Hals & Norcross.....	1.40	1.60	1.35	1.45
Julia.....	.10	.20	.15	.10
Justice.....	.15	.20	.15	.10
Kentuck.....	.15	.20	.15	.10
Lady Wash.....	.15	.20	.15	.10
Mono.....	.60	.60	.60	.60
Mexican.....	1.75	2.2	1.85	2.10
Navajo.....	.10	.20	.25	.15
North Belle Isle.....	.20	.30	.35	.25
Nev. Queen.....	1.10	1.15	1.25	1.00
Occidental.....	.40	.5	.45	.50
Opbir.....	2.55	3.20	2.85	3.20
Overman.....	.55	.65	.40	.50
Potosi.....	1.10	1.30	.95	1.25
Piedra.....	.65	.75	.65	.65
Peor.....	.65	.75	.65	.65
Savage.....	1.35	1.60	1.35	1.40
S. B. & M.....	.40	.45	.30	.35
Sierra Nevada.....	1.30	1.50	1.30	1.45
Silver Hill.....	.10	.10	.10	.10
Scorpion.....	.10	.10	.10	.10
Union Con.....	1.50	1.55	1.30	1.45
Utah.....	.35	.40	.30	.35
Yellow Jacket.....	.80	.85	.70	.80

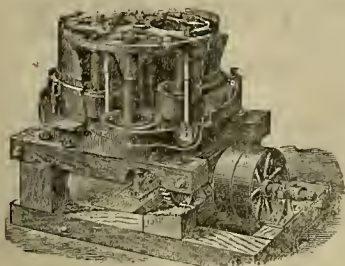
*Assessment added.

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DEAR SIR: Yours of the 9th to hand. In reply will state that the one-horse power Gasoline Engine I got from you has been running every day, for the past three weeks, and has given entire satisfaction. It is placed in a tunnel full 300 feet from the surface, and is hoisting ore from 100 feet below that. It does all you claimed for it, and is the best and cheapest power that can be had in or about a mine. A number of mining men in this locality have viewed the machine in operation, and they all pronounce it a perfect success.

Yours truly, F. L. McPHERSON.

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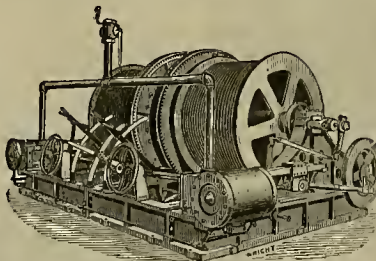
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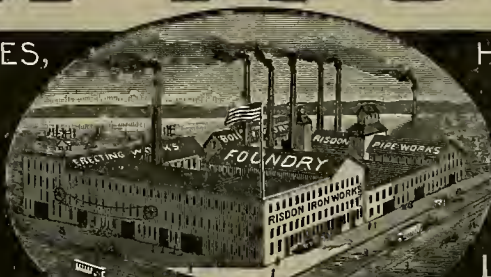
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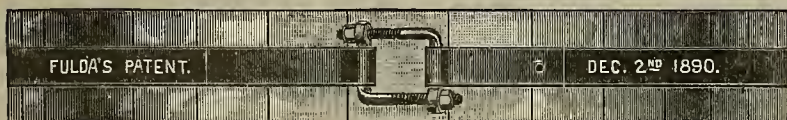
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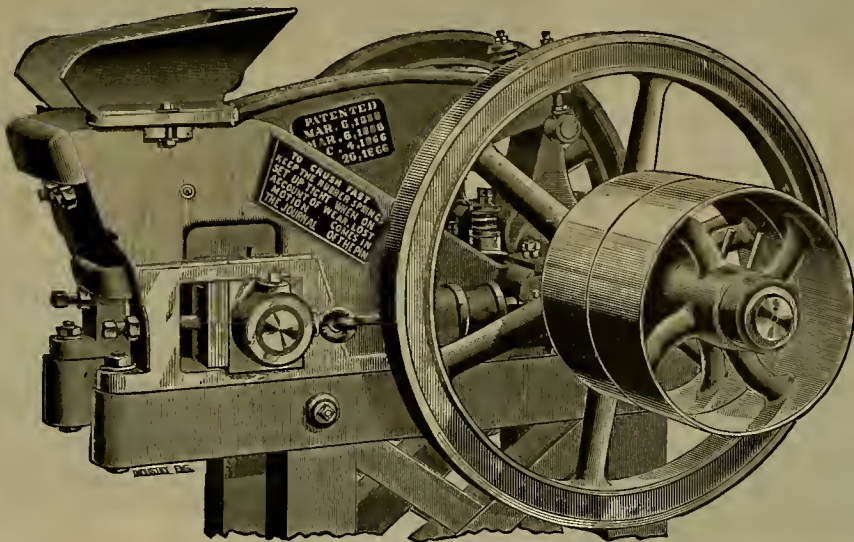
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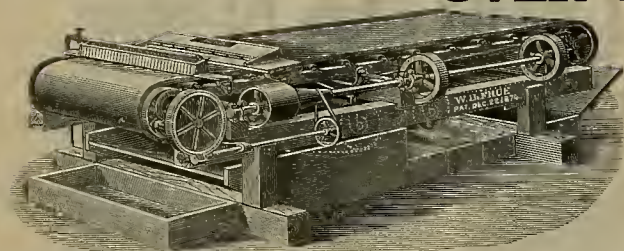
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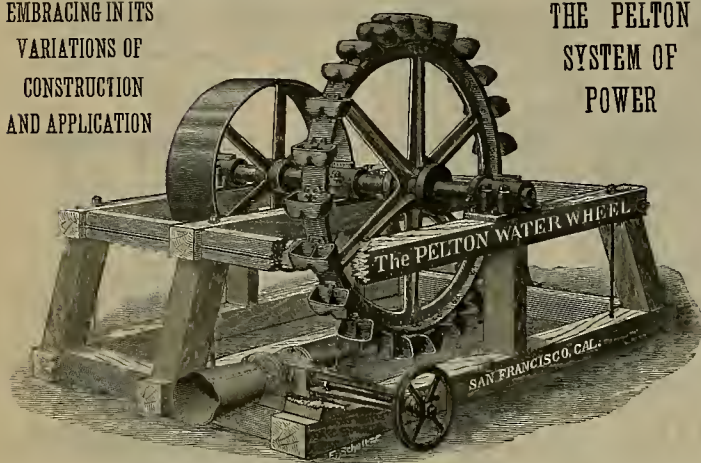
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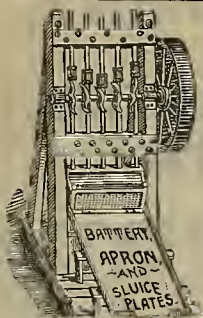
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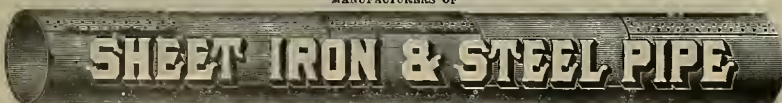
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Mechanics and Popular Science.

VOL. LXIV. — Number 25.
DEWEY PUBLISHING CO.

SAN FRANCISCO, SATURDAY, JUNE 18, 1892.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

Buffalo Steam Pumps.

The Buffalo Steam Pump Company of Buffalo, N. Y., have recently designed and introduced certain important improvements in the many forms of steam pumps which they manufacture for all general and special purposes of pumping service; and we here present a cut illustrative of one of their latest designs of compound condensing mining pumps, duplex boiler feed pump and a duplex power-gear pump.

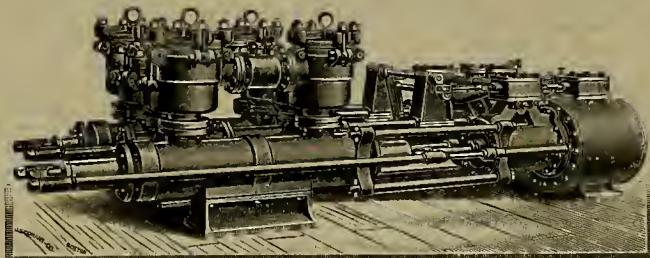
One of the engravings gives a perspective view of the compound condensing mining pump.

Three of this style of pump were recently built for use in the Gogebic and Minnesota iron ranges, and are doing effective work. The high pressure cylinders of the pump illustrated are 12 inches diameter; low pressure cylinders, 22 inches diameter; stroke, 18 inches; and the plungers are seven inches diameter. Their rated capacities are 300 to 350 gallons each per minute, delivered 600 feet above the pumping station, with a steam pressure of 65 pounds in the initial steam chest. The plungers are tied together with steel tie-rods coupled into cast-steel crossheads, and are carried through bronze-lined stuffing box glands. The water passages are one-half (50 per cent) of the plunger area. Each valve chamber contains three valves of a size that also equals one-half (50 per cent) of the plunger area; both the suction and discharge valves are overhead, so that the plungers are always water-packed. The caps of the valve chambers are held by swing bolts. The pumps are supplied through a seven-inch suction pipe, and the discharge is driven through a six-inch column. They are provided with improved single air-pumps and condensers, designed for the most severe duty. The valves of the steam cylinder are of the ordinary plain slide type, and arranged to run by the ordinary duplex movement.

Another pump has been built upon the same plan. The high pressure cylinders are 16 inches in diameter; the low pressure cylinders are 30 inches in diameter; stroke, 18 inches; and diameter of plungers, nine inches. The rated capacity of this pump is 500 gallons per minute, discharged at a height of 500 feet. These pumps are well designed, as represented in the cut; due attention having been given to strength, thereby insuring durability, and as well to simplicity in construction and accessibility of their several parts, thus attaining the desideratum of constantly active service,

with the expenditure of a minimum amount of labor and attendance.

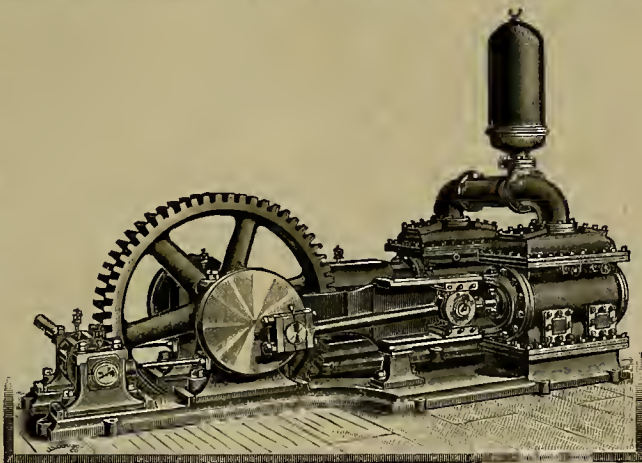
Another cut presents a perspective view of a new design of a duplex boiler feed pump, recently introduced by the above-named company. They are fitted with end suction and discharge pipes, and are built to work against a pressure of 250 pounds. The water cylinders are fitted with remov-



COMPOUND CONDENSING MINING PUMP.

able brass linings. There are seven sizes of this style of pump built by the manufacturers, ranging from $3\frac{1}{2} \times 2 \times 3$ to $7\frac{1}{2} \times 5 \times 8$ inches. All of the parts are made to templates and gauges and are interchangeable, so that any part can be quickly replaced in the event that necessity requires such replacement.

Another design presents a recently improved form of a power-gear pump. These power pumps are double-acting and



BUFFALO DUPLEX POWER GEARED PUMP.

provided with patent removable water barrels; have heavy crank shaft, connecting rods, crossheads, gears, etc. The bearings and slides are arranged for taking up wear. They are built with great care from careful designs, and are well adapted for the heavy work of a power pump. This style of pump should be run at a much slower speed than steam pumps, as all shocks given to the propelling power are transmitted directly to the pump; in a steam pump the steam pressure is elastic, which gives an entirely different action to the pump. The power pumps can be geared direct to the jack shaft of turbine water wheels, or driven by gear connection from a line shaft, or can be driven by belt. They are furnished of any capacities up to 5,000,000 gallons per day.

The agency for the sale in the Pacific States of the above-described pumps, as well as other special forms built by the Buffalo Steam Pump Co., is under the direct management of the Joshua Hendy Machine Works, No. 51 Fremont St., San Francisco.

PROF. T. S. C. LOWE, of Pasadena, has been appointed one of the Yosemite Com-

missioners by the Governor. Professor Lowe is one of the best-known men in the southern part of the State. He is remarkably progressive, and has done more to push the interests of the San Gabriel valley than any other one man. He is now building an electric railroad up Mount Wilson. Professor Lowe is a scientist of national reputation. He is the inventor of the system of water gas that has made such a radical change in the use of light and heat.

Professor Lowe is one of the wealthiest men in Southern California, is president of the Citizens' Bank of Los Angeles, and has one of the most palatial homes in the State, in Pasadena.

A SPECIAL TRAIN of 11 cars, loaded with 150 tons of refined asphalt from the newly completed refinery at Bakersfield, Kern Co., left on Monday for Sedalia, Mo., where it is to be used for pavements. The train was photographed and so placarded as to show that it is a new California industry whose home is in Kern county.

A STRIKE of gold-bearing ore is announced on Texada island, in the straits of Georgia, about 30 miles from Nanaimo, B. C.

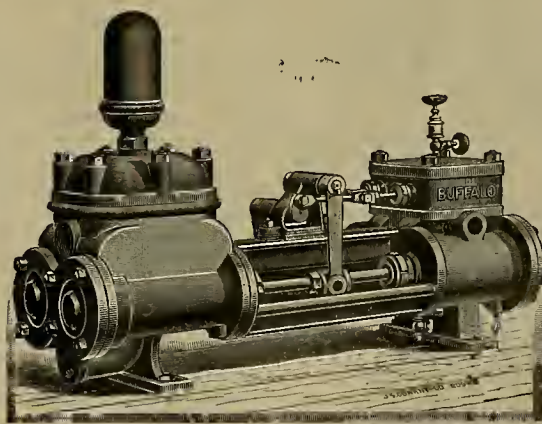
An Amalgamating Device.

Alva M. Stetson, of Oakland, has patented through the MINING AND SCIENTIFIC PRESS Patent Agency an apparatus consisting of a series of superposed shelves or drawers made of amalgamated plates having upturned sides, with perforations made through the amalgamated bottom, and drawers being so arranged that the material falling through the openings will be received upon an amalgamated plate or mercury below, whereby the gold is forced into intimate contact with the mercury by the impact or by its fall. The drawers are placed in such a position that the holes in one drawer will stand above the unperforated part of the surface of the next below it. In the drawers carrying the mercury there are channels for that metal which come under the holes of the tray above. Between these channels are the elevated portions having holes made through them with a considerable imperforate interval between each elevated portion. The drawers containing the free mercury may be alternated with the amalgamated plates.

The metal-bearing pulp, mixed with a sufficient quantity of water, is admitted into the upper part of the apparatus by a sluice. Falling into the upper tray or chamber having a perforated bottom, the pulp is distributed over this bottom and passes through the holes, falling upon the amalgamated surfaces of the drawer next beneath.

These drawers are a sufficient distance apart so that the falling material will gather some momentum and strike the amalgamated plate or mercury trough, as the case may be, with considerable force. This brings any gold or precious metal contained in the pulp in very to intimate contact with the mercury

or amalgamated surface, the gold being, as it were, forced into or against the mercury, by which operation the latter will take up a greater quantity than if the pulp were allowed to pass over amalgamated plates by flowing in the usual manner. The intermediate or ultimate mercury-containing drawers or troughs allow the gold to be entirely submerged when it strikes the mercury. The lighter and more worthless portions of the pulp rise above the level of the ribs in these mercury-containing drawers and flow over them, so as to pass down through the holes which are made through the ribs. In this way the gold will have a tendency to remain in the mercury and not flow off with the lighter particles of the material.



BUFFALO DUPLEX BOILER FEED PUMP.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Ed.

Kamloops Mining District.

A Region for Prospectors and Miners.

KAMLOOPS, B. C., June 4, 1892.

TO THE EDITOR:—The discoveries which have lately been made in the valley of the North Thompson demonstrate what has been long believed—that the valley of this river and its tributaries is a most promising mineral region, and one which to the present time remains almost entirely unexplored. The reasons for this belief are that the principal streams forming this river take their rise in the same district as do the waters of the Quesnelle and other large gold-carrying creeks and rivers which have made Fraser River and Cariboo famous for the last 30 years. The waters of the Thompson cut through the slaty rocks which carry the Cariboo gold, and also the limestone and other formations which furnish the argentiferous minerals of the Kootenay districts. Gold has been found in the quartz at Jameson creek, which is about 17 miles from Kamloops, and it also exists on the east bank of the North Thompson near Lewis creek. Quartz rich in silver has been discovered near the junction of the Clearwater river with the North Thompson, about 75 miles from Kamloops. Mineral is known to exist in large quantities at Mahood lake, whose outlet is into the Clearwater. At Tum Tum lake, southeasterly from the upper valley of the North Thompson, very rich argentiferous ore was found many years ago. The sources of this lake reach easterly up to the summit of the Gold Range, on the opposite or eastern side of which is Smith creek, where gold is now successfully mined. Tum Tum lake finds an outlet southerly into Adam's lake, a beautiful sheet of water, on the shores of which fine samples of galena or silver-lead ore have been found. This lake is 50 to 60 miles long and 3 to 5 miles wide, lying east of North Thompson river valley and parallel to its course, some 20 miles distant. It is accessible by trail which follows the course of Lewis creek, and diverges from the wagon-road about 35 miles out from Kamloops. There are no mining locations yet made in this extensive region, which is nearly 200 miles long and about 100 miles broad, reaching to the borders of Cariboo on the north-northwest and to Big Bend on the east, except a few which have been recently taken up, and which are referred to in the report of Mr. H. R. Bellamy, a mining expert, who visited them about three weeks ago. He reports: "My trip up the North river has been of great interest to me, as all new fields of exploration are, especially when they abound in minerals. In relation to these, I wish it understood that I have no desire to overdraw a picture of that district, as I own no interest, and have no axe to grind, and I have long since seen the folly of overestimating mines. I shall describe only what came under my own observation during the trip.

"After leaving the coal camp, to pay a visit to the silver mines 25 miles farther up the river, I was in coal measures for some nine miles, when the granite formations commenced to make their appearance, intermixed with limestone, porphyry, black jasper and quartz leads. I dismounted in several places to inspect them, and could detect silver, lead and copper, and brought down some of the specimens. Arriving at the silver mines, I found no one at home, and could therefore get no information, but found the claims readily. They are three in number, with several tons of ore on the dump. The "Lone Prospector" and the "Ironclad" have had the most work done on them. The mineral in the first named lead showed nearly two feet of clear galena. The vein is three feet three inches, and has a tendency of getting much wider. The mine known as the "Ironclad" is, perhaps, fully as rich. There are several other leads opened, but not much work has been done on them. There are reports of prospects being opened farther up the river, but I did not have time to investigate them."

The following extract is taken from the report of an interview with Mr. Bellamy, in a Vancouver paper: "He found the indications at all of them excellent, and is certain that as soon as facilities are given for getting the rock to the smelter at reasonable outlay, that great profit will be made out of them. Specimens from these mines had been assayed by Mr. Price, the celebrated assayer of San Francisco, and had been found to contain \$50 to the ton.

"Mr. Bellamy said that while these were the only silver ledges being developed, they were by no means the only claims with rich indications. The whole country round about

from these to Kamloops, was rich with silver-bearing quartz, and any number of extremely rich ledges were to be obtained. Besides silver, there were heavy deposits of copper in the country."

In Prof. Selwyn's report of the Geological Survey of Kamloops District for 1891, just issued at Ottawa, he makes the following reference to this section: "It may be mentioned that the numerous discoveries of silver-bearing galena on the North Thompson river at Mosquito Flat, and above the Clearwater, are attracting a good deal of attention. These localities are situated about 50 miles and 75 miles respectively from Kamloops. The ores are said to give rich assays."

These discoveries, in places separated by long distances, all within the well-ascertained mineral belt, give unmistakable indications that there is a great abundance of rich ore lying in and near the region described, which a thorough exploration by energetic and intelligent prospectors would bring to light, not only making fortunes for themselves, but enriching the entire district.

The way to reach this extensive district is by way of the North Thompson from Kamloops. This place is located 250 miles east of Vancouver on the C. P. R., and here can be obtained, at reasonable prices, the needful outfit of provisions and miner's supplies. A good wagon road has been constructed 35 miles out from Kamloops, and trails are used from that point. The weather is favorable in this district, there being very little rain to interfere with prospecting. The climate is healthy, and the season is nearly two months longer than it is farther east in the Selkirk and Rocky mountains. There is no unexplored section of British Columbia so easy of access, where prospecting can be prosecuted with such assurance of favorable results as in this one.

About 50 miles from Kamloops, on the river, coal of good quality has been found, and a company has been formed, which is now developing one of the locations with good and improving prospects. The seams of coal are within a short distance of the silver mines already discovered, and possess coking qualities which will be invaluable for smelting the ores.

The North Thompson is navigable for 120 miles for large steamers. In addition to this, and more important still, is the interest which certain leading men of the Canadian Pacific railway, and other capitalists, are taking in the quartz mines at Mosquito Flats, as well as the coal mines, and is a sure indication that a branch railway will be built up the North Thompson from Kamloops.

Within a few miles of Kamloops, there is an inexhaustible supply of magnetic iron ore, which has been pronounced by the smelters of the Pacific coast to be invaluable for smelting purposes.

The location of Kamloops at the confluence of the North and South Thompson rivers, furnishing nearly 400 miles of lake and river navigation; with its iron mine, its coal mines, its control of timber resources; making the safe foundation for the establishment of iron furnaces, and smelters for the reduction of ores, and the manufacture of lumber and furniture, in addition to its unexcelled climate—besides being the place whence will start the Kamloops, Cariboo and Alaska railway up the valley of the North Thompson, should and doubtless will attract the attention of capitalists, and make Kamloops the active and prosperous city of the interior which its natural position and advantages entitle it to become.

Mining in Montana.

Joseph Hogan, State Mining Inspector, is in the city. Speaking of the industry of mining throughout the State, he finds that while there are probably as many, if not more, men actually engaged in mining, the amount of prospecting and development work going on is not as great as this time a year ago. The operation of the Anaconda properties keeps the number of men at work in mining about the same as that of a year ago. He finds that the big companies are not doing the amount of "dead" work that is usually going on, but they are taking out just enough ore to keep the properties running. The hills, which a year ago were alive with prospectors, are almost deserted now. All this inactivity he attributes to the low price of silver. It discourages the prospector and leaser, who are not particularly zealous about devoting all their energies for the benefit of the owners of reduction works.

"How is the coal mining industry progressing in Montana?" asked the reporter. "It is ever on the increase. There are about 1500 miners engaged in coal mining at present, divided as follows: Rocky Fork, 400 men; Sand Coulee, 450; Horr Coal and

Coke Co., 300; Cokedale, 200; Timberline, 150; Belt mines, 50. Besides these, small forces are at work in the new coal discoveries of the Flathead and Milk river valleys. Outside of those I have mentioned, there are probably 100 men at work on other coal and coke properties. But 1500 men is a pretty reliable estimate of the whole number.

"I expect to see fully 2000 men at work in coal mines before the year is out. The Anaconda Company, which is reported to have become interested in the Belt coal fields, will, no doubt, work its property on a scale similar to that with which it undertakes every enterprise.—Inter-Mountain.

Reno Reduction Works.

We are informed from a reliable source that the reduction works will hang up its stamps this evening.

The business of milling ores on the Truckee river will cease, at least for a few weeks, but it is expected that arrangements will be perfected in a short time so that business will be resumed. Mr. Beck informs us that Mr. Farrington has met with so many reverses in mining operations during the last four years that he is to-day without capital to prosecute his mining and milling operations any further. The reduction works, which were rebuilt by Mr. Beck for Mr. Farrington during the last six months, were yesterday turned over to Mr. Beck as his sole property in payment for advances made in rebuilding and otherwise. In a few days Mr. Farrington will leave Reno for the southern mining country to start anew, and we are proud to say that the best wishes of every one who knows Archie Farrington will go with him, for he is certainly one who has fought nobly for the best interests of Nevada, and, unlike others who made fortunes in our State, he spent his last dollar in fighting in favor of our principal industry—silver mining.

The low price of silver and the high rates of freight on ores have been almost the direct cause of the financial failure of Mr. Farrington.

Mr. Beck thinks he will in a few weeks be in shape to start the works again, and believes that if the railways will make a concession in favor of lower rates on low-grade ores, that the enterprise of milling on the Truckee can be made a permanent industry.

FARRINGTON'S MISTAKE.

The above is from the *Reno Journal*. All of Esmeralda's people sympathize with Mr. Farrington, but at the same time we cannot help regretting that Mr. Farrington should have taken the money he made in the mines of this county and dropped it into the Truckee river through the reduction works. If he had erected a smelter at Cat Creek, near Walker Lake, he would have realized a handsome return. The freight rates would have been small, and owners of promising low-grade mines would have been encouraged to prospect, knowing that they could have their ore worked cheaply at home. Lead-silver ledges are plentiful in this county, but the cost of shipping and smelting is enormous, and nothing but high-grade ores can be handled. With a smelter at Cat Creek, a large number of men would be working night and day to furnish it with ore.—Walker Lake Bulletin.

Arizona Copper.

The Arizona *Silver Belt* says:

The product of the Old Dominion Copper Co. in May, with three furnaces in blast most of the time, was 1,014,000 pounds of copper, by far the largest output in one month ever made by the company. A little more than 6,000 tons of burden (ore and flux) was put through the furnaces. Consequently the product was only 8.4-10 per cent of the burden.

The significance of this showing lies in the demonstrated efficiency of the plant and ability of the company to work successfully, ores averaging as low as 8 per cent in copper. It shows conclusively that the Old Dominion Copper Co. can compete with any mine in the production of copper.

The company's mines, which it was predicted years ago would soon play out, appear now to be only in the infancy of productiveness. Much new ground has been recently opened in the Alice claim, where two winzes are being sunk from the tunnel, one in ore and the other showing strong indications of it. Notwithstanding the heavy draft upon the ore bodies during the past month, the supply of ore is now larger than ever, and constantly increasing.

The output of copper is limited only by the capacity of the plant and the will of the company.

Coal at Nanaimo, B. C.

The city of Nanaimo and suburbs, with the 6000 or 7000 inhabitants, owes its prosperity and its very existence to the New Vancouver Coal-Mining & Land Co., which, in 1862, bought and obtained a transfer from the Hudson's Bay Co. of the valuable Nanaimo estate, with the collieries, its town and other buildings, sawmill and shipping wharves, including all the dominant shore and other rights and privileges, held by the Hudson's Bay Co. by virtue of its special charter and grant from the crown. The mines and works of the New Vancouver Coal-Mining & Land Co. form the main resources of the town, and the great bulk of its inhabitants are directly or indirectly dependent upon the success of the coal industry, which is promoted so energetically by the company. For several years after the commencement of its career the company was struggling against many difficulties. Natural "faults" in the subterranean strata and other causes, together effected discouraging results, so that the total output between 1862 and 1883 only ranged from 20,000 to 90,000 tons of coal per annum, the highest figure being reached in 1883. In 1884, by more energetic management, the output of coal rose to 103,000 tons and steadily increased until a production of coal from the mines of the New Vancouver Coal-Mining & Land Co. amounting in round numbers to 500,000 tons per annum has been achieved, with a most promising outlook for a further increase in the demand for the famous Nanaimo, Southfield and New Wellington coal, mined by this company only. Of the immense output about 400,000 tons were exported and about 60,000 were distributed in local sales, and the remainder put for consumption in the furnaces of the 30 or more engines of the company itself, which use an average quantity of 100 tons a day. To meet the great extension of the company's business the capital of the company was augmented, but by no means correspondingly with the expansion of the concern.

The company has at present five mines open and four in active operation—all commenced since 1874. They run down to great depths, and have double shafts (or pits) for ventilating, the law not allowing more than a limited number of men to work in a mine with but one shaft. The gross output from these mines has aggregated 2000 tons a day.—Coal Trade Journal.

A Code of Mine Signals.

State Senator E. C. Voorheis is corresponding with the different mining engineers of the State with a view of introducing in the next legislature a bill for the enforcement of a uniform system of signals in all the mines of the State. At the present time the code of signals are so at variance in different mines that a man going from one to the other is utterly at a loss to understand them; and that there are not more accidents in consequence is due more to luck than anything else.

We print below for the benefit of all concerned, the code of signals now in use by the two thousand and odd mines of the State of Colorado. The *Record* asks that all the papers of the State will help along this much needed improvement in mine management. Any letters of inquiry addressed to this office or to Hon. E. C. Voorheis, Sutter Creek, Amador county, California, will be promptly answered.

- 1 bell—To hoist. (See rule 2.)
- 1 bell—Stop if in motion.
- 2 bells—Lower. (See rule 2.)
- 1-1-1 bells—Man to be hoisted. Run slow. (See rule 3.)
- 4 bells—Stop and start pump.
- 1 3 "—Stop and start air compressor.
- 5 "—Send down tools. (See rule 4.)
- 6 "—Send down timbers. (See rule 4.)
- 7 bells—Accident. Move hucket or cage only by verbal orders.
- 1-4 bells—Foreman wanted.
- 2-1 1 bells—Done hoisting until called.
- 2-1-2 "—Done hoisting for the day.
- 2-2-2 "—Change buckets. From ore to water or vice versa.
- 3-2-1 bells—Ready to shoot in the shaft. (See rule 3.)

Engineer's Signal. That he is ready to hoist is to raise the bucket or cage two feet and lower again. (See rule 3.)

Rule 1. In giving signals make strokes on bell at regular intervals. The bar (—) must take the same time as for one stroke of the bell and no more. If timber, tools, the foreman, bucket or cage are wanted to stop at any level in the mine, signal by number of strokes on the bell, the number of the

level first, before giving signal for timber, tools, etc. Time between signals to be double bars —. Proposition: 6 — 5 bells would mean stop at 6th level (with tools); 4 — 1-1-1 — 1 would mean stop at 4th level, (man on), (hoist); 2 — 1-4 would mean stop at second level (with foreman).

2. No person must get on or off the bucket or cage while in motion. When men are to be hoisted, give signal for men. Men must then get on bucket or cage, then give signal to hoist. Bell cord must be in reach of man on the bucket at stations.

3. After signal "ready to shoot in shaft" engineer must give his signal when he is ready to hoist. Miners must then give signal of "men to be hoisted." Then "split fuse," get into the bucket and give signal to hoist.

4. All timbers, tools, etc., "longer than the depth of the bucket," to be hoisted or lowered must be securely lashed to the cable. Miners must know they will ride up or down the shaft without catching on rocks or timbers and be thrown out.

5. The foreman will see that one printed sheet of these signals and rules for each level and one for the engine room are attached to a board 12 inches wide by 36 inches long and securely fasten the board up where signals can be easily read at the places above stated.

A Revival in Mining.

Dwellers in Colorado for the past 20 years unite in the opinion that the prospects for the mining industry were never better than they were to-day, says the *Denver Sun*, and there has never been a time in the history of Colorado when the new districts opened up gave stronger evidences of continued prosperity.

Mining camps of a permanent character are not often developed in a month, or even a year. It was two years after the first discovery of the value of carbonates before Leadville became what it has since remained, and when B. Clark Wheeler came to Leadville to sell town lots in his new town of Roaring Forks, just across the river from the present towns of Aspen, and predicted that the mines of that district would rival Leadville, he was considered visionary. That was in 1890, and though the men who pinned their faith to Aspen continued to delve and open up the deposits which underlie that wonderful camp, it was five years before the camp began to show any indications of the great mining center that it has since become.

Twenty years ago the treatment of ores containing refractory elements in an economical manner, was not generally understood, and as a result, many districts known to be rich in the precious metals were left undeveloped; even where there was a minimum of the refractory minerals time was necessary to reduce the system of mining and reduction to a profitable basis. This has been greatly changed, and while much has to be learned and new discoveries are continually being made in the matter of the reduction of ores, there must be an unusual amount of stubborn qualities in an ore to cause its rejection at the smelter. The result is that a greater proportion of the ore found is merchantable. That of itself is a stimulus to the mining industry, causing the working of veins long since abandoned, the product of which assures a moderate profit.

The changed conditions affect the new camps by shortening the time of probation which they must necessarily undergo. But development work must still be done. A discovery is not a mine, for there are few prospects in which the discovery shaft opens an ore body sufficiently large to pay from the start. Development alone makes a mine, and while prospects are sometimes sold for handsome figures, large investors look for more than a mere chance, for as the miner has it "one man can look as far into the ground as another."

The fact, therefore, of such large sales as have been made at Creede, at Cripple Creek and at Copper Rock camps of only a few months existence, in which the development is necessarily of the most primitive character, is a strong indication that the season of 1892 is one that will witness a revival of the mining interests such as has not been witnessed since the boom days of Leadville passed into history and that camp settled down to the position of one of the greatest steady producers in the world. Mining property is always sought for when backed with something tangible, and it is evident that the new camps have backing of no trifling character.

TEAS.—Recent investigation has shown that the amount of tannin, which is the noxious element in tea, is from three to five times as great in Bengal and Ceylon leaf as in the Chinese.

Works at Anaconda.

Anaconda is one of the wonders of Montana, and of the world; and yet how many Montanians not actively engaged in mining or the reduction business know anything about it? Not one in a thousand. A representative of the *Montana Mining Review* has been permitted to inspect these marvelous works, and will endeavor to give a plain and brief account of what he saw there.

The situation of Anaconda is decidedly pleasant and attractive. Nestled in a snug corner of the Deer Lodge valley, it has a tall and massive mountain in its rear, covered with perpetual snow, while a lower range of grass-covered hills, reminding one of those of Switzerland, comes down to the valley's edge, giving form and color to a scene that is filled with surprises for the observer. The neat passenger station is near the heart of the town and only a short walk from the Montana hotel, the largest and finest in the State. It has not the beautiful surroundings of the Broadwater, but is a city hotel of simple brick and mortar, in every way suitable for a city of 100,000 inhabitants, and altogether wonderful in a town of 6,000, most of whom are laboring men baving their own homes.

On the right as you enter the town, you see the great reduction works of the Anaconda Company, extending for upward of two miles along the hillside; and on the crest of the ridge above them rise the huge brick chimneys which carry off the smoke and fumes from the smelters and other works. Two immense flumes run along the hillside, one on the lower, the other on the upper level, to supply every branch of the colossal plant with the cleansing liquid. Water plays an important part, as we shall see, in all its processes, and it is provided and distributed in a very skillful way.

A visit to the works can only be made by permit, and regular sentries must be passed at all salient points. The upper or old works consist of a large concentrator and smelters Nos. 1 and 2, the lower or new works of the largest and most complete smelter and concentrator in America. About 1800 men are now on the payrolls at these works, and all are as busy as bees, one-half working by day and the others by night. Besides these sections of the plant, the electrolytic refining process, occupying three large buildings, is now in operation, as also a large battery of Bessemer converters, which are taking some fortunes out of the slag thrown away by former imperfect systems. With the process now in use, there is no object in keeping the slag for further treatment; therefore, when it is drawn off from the furnaces, it is run into a jet of water driven at high pressure, which granulates the slag and carries it far away through the waste sluices in the form of coarse sand or dust flakes. This is an immense saving of time and labor, it being estimated that at least 200 more men would be needed to remove this slag. The system was introduced by Mr. Stalmann, one of Mr. Daly's right-hand men.

For the benefit of the lay reader, a brief account is given of the process from the ore to the mercantile commodity.

When it comes from the mine, most of the Anaconda ore is a grayish-looking rock, much of it having the mixed metal running in streaks through it. The trains of the Montana Union are now taking down about 4000 tons a day. The works are approached by tracks along the hillside for the upper and lower levels, and the ore is delivered into the bins of the concentrators on the upper line. These bins have a storage capacity of 78,000 tons, so that sufficient may always be on hand for several days' work. From the bins the ore passes through the concentrator, which begins by crushing it, and then, by various washing devices, carries away the nonmetal portions, reducing the bulk so that only the mineral goes back to the smelter. From stage to stage, by gravity, the concentrates descend until they are finally carried off by a force of water into the settling rooms. Here the water is automatically drained off, and the concentrates, in the form of fine sand, are hauled back to the smelter on top of the hill to have the metals melted out of them. This hauling is done over a trestlework tramway with a regular hoisting engine. The cars are wheeled on iron tracks and emptied first into huge revolving iron cylinders, which destroy a greater part of the sulphur. Then the red-hot mass is discharged into the furnace, where it is reduced to liquid and drawn off into molds. The metal so drawn is known as matte, and contains not only the precious metals, but a percentage of iron and other base metals. It has been the custom to ship it in this shape to Wales, Germany and elsewhere for separation and

refinement, but Mr. Daly lately became convinced that all this could be successfully done in Anaconda, and the sequel shows that he was right.

He is at present producing in his electrolytic works the copper in pure ingots and saving the silver and gold from the matte. It is now simply a question of time and policy whether the more extensive works for this process shall be erected in Anaconda or at some other point. Built they are sure to be, and that, probably, within another year.

With a payroll of over \$140,000 a year, and the expense of 400 tons of coal and 180 cords of wood each 24 hours, it is readily understood what an enormous product there must be even if no account were taken of the millions invested in the plant. It is estimated that the electrolytic works, when completed, will employ about as many men as are now working in the present plant, so that there is a probability of Anaconda being about doubled in population within a year or two.

To say that Anaconda is worth seeing would be a mere commonplace. The *Review* goes further and says that every Montanian who fails to see it is recreant to his duty as a patriotic citizen. The railroad trip is an easy and comfortable one; the hotel is all that any one can desire. There are electric cars to all points at 5 cents fare. The town is splendidly lighted with electricity, sewerage throughout, and has a plentiful supply of pure mountain spring water. No one can form an intelligent notion of the great mining industry of Montana until he has visited Anaconda.

Something should be said about the model cottages and many other things that have been produced there by the ruling genius of Marcus Daly, but space makes it necessary to put this off till another issue. From start to finish throughout the works it is plain that an intelligent class of labor is employed, and wherever one goes he hears nothing but praise and words of affection for the man who, with his able lieutenants, has brought this world of wonders out of nothing.

The poor Irish boy who landed as an emigrant, and worked on the docks of New York, at the age of 55 is a millionaire; but he is more than that. Throughout his career in building up the Anaconda works, he has been a human benefactor, winning the confidence, esteem and affection of all who know him through little deeds of kindness that have been as secret as they were timely. Mr. Daly has a great faculty for choosing the right men for assistants, and his success is due almost as much to this fact as to his own great initiative genius and enterprise. He is liberal, generous and genial to everybody, and it is safe to say that no man in Montana is more beloved by his employees than Marcus Daly.

The Big Telescope.

The Second Glass for It Arrives from Paris — The Photographic Instrument.

News reaches Mr. Raymond from Boston that the second lens for the great 40-inch glass contracted for by the University of Southern California has been received by the Clarkes from M. Mantois, the Paris manufacturer. It is known to our readers that the university project involves the erection on Mt. Wilson of the largest visual telescope in the world, and that Alvan Clarke & Sons, of Cambridge, were awarded the contract to finish the two lenses necessary for it, which are each 40 inches in diameter—four inches larger than the Lick Observatory glass. The contract for casting these great lenses was given to M. Mantois, the only man in the world, probably, capable of doing the work. The first lens was completed about two years ago, and has been in the hands of the Clarkes ever since. After repeated failures, the second lens has just been turned out and received at Cambridge, as stated. Each cost \$8000. They are to be finished by Clarke & Sons, but when that part of the contract will be carried out is very uncertain, as the money for it is not forthcoming. The finances of the University of Southern California are not in condition to stand any further expense, and the whole project will necessarily be in abeyance until some rich individual endows the astronomical department of the institution. The construction of a 24 inch photographic telescope and its erection on Mt. Wilson is a distinct enterprise, as is generally known. That is under the auspices of Harvard College, of Cambridge, and the money for it has been provided in advance by a wealthy New York lady. The Clarkes also have this instrument in hand and are hard at work upon it. When completed, it will be the

largest photographic telescope ever constructed.

From information lately received, it seems increasingly probable that the observatory for it will be put on Mt. Wilson, as contemplated. President Eliot's recent visit to the site is thought to have virtually settled the location, but, of course, nothing official on the subject has yet been announced.—Pasadena Star.

COKING COALS OF WASHINGTON.—Gen.

A. Dehune, State Geologist of Washington, in his second annual report, gives a lengthy description of the coals of Washington, comprising lignites, semibituminous and bituminous coals. The lignites extend from the county of Whatcom on the north, through King, Pierce, Thurston, Cowlitz and Chelan counties to the southward. Eighteen workable seams have been uncovered. The extent of the lignite vein is estimated at 650,000 acres. Twelve mines are now in active operation in this district.

The bituminous and semibituminous measures of the basin are found below and east of the lignites. These bituminous measures extend from Lake Whatcom on the north to Lewis county on the south. Seams of coal adapted to the manufacture of coke are found in Skagit, King, Pierce and Whatcom counties, in Western Washington, and in Kittitas county, in the eastern part of the State.

The coking operations are enumerated as follows: The Fairhaven mines of the Skagit Coal and Transportation Company, Whatcom county; 8 measures, 4 workable; thickness of seams, 9 feet, 12 feet, 9 inches, 18½ feet, 21 1-12 feet and 23 feet. All are cut by a 1200-foot tunnel. The company is erecting coke ovens.

The Connor-Cumberland mines are located near Hamilton, Skagit county. Six seams have been developed, measuring 3 feet, 4 feet, 5½ feet, 3½ feet, 3 feet and 3 feet 4 inches. The coal is friable and cokes well. The Snoqualmie Coal and Coking Company is working 6 seams of coal on the Snoqualmie river, 7 miles from Snoqualmie Falls. The width of the coking seam is 7 feet 6 inches. The Wilkeson Group is the name given 9 seams of coking coal being mined in the south end of the Puget Sound basin, in the southeastern part of Pierce county. The Wilkeson Coal and Coke Company has a of ovens in plant operation.

THE EUREKA MINE TESTED.—These

are lively times at the Eureka mine, near Hornitos. The last carload of machinery recently went up from Merced, and a preliminary run has already been made by the mill. The results were highly satisfactory; the more so, as the rock crushed was from the 100-foot level, where the grade is much below that of the ores found at a greater depth. The experiment has proven the success of the venture beyond all question, and in view of the values secured in amalgam and concentrates, it is a wonder this remarkable mine has escaped the attention of capitalists so long. The Eureka is a true fissure in slate. The vein is very large, running from 5 to 20 feet in width, carrying gold, silver, sulphurets, etc., and is opened to a depth of 200 feet by a shaft, and levels driven therefrom. Besides this there is a mountain of ore behind and above the mill, well opened by tunnels and which a 30-stamp mill could not exhaust in years. So the amount of ore practically in sight is phenomenal. It is the intention of Dr. Callahan and his associates to run the mill by electric power from the Merced river at no remote day, and when this is done it will be possible to work cheaply and profitably not only the Eureka, but all other good mines in the vicinity of Hornitos and Quartz mountain.—Merced County Sun.

USE OF GRAPHITE.—Referring to the

use of graphite, a correspondent in a contemporary says: "In making pipe cement, or as I would term it, pipe smear, it is not necessary to use the best oil or grease, as it is the graphite, and not the body in which it is suspended, that makes the mixture valuable and the joint perfect. I use the drippings from line shaft bearings, caught in the ordinary way and mix them with the best Ticonderoga flake graphite so that the compound can be applied with an ordinary sash tool. During the past three years I have used about 15 or 20 pounds of dry flake graphite for pipe joints, cylinder heads, piston rod packing, etc. Bolts smeared with graphite mixed as above, I have unscrewed after having been in the dampest places for upward of two years, or more, proving the anti-rusting qualities of graphite. To cool hot bearings put it on as thick as it will mix with oil."

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

ZEILE.—*Ledger*, June 11: The air shaft has been repaired sufficiently to enable the miners to go to work again. A large number of the men returned to work Monday, and others a day or two afterward. The mill was started on Wednesday, so that this great mine—the mainstay of Jackson—is again in full working shape.

BAY STATE.—This mine continues to look encouraging. The ore body encountered last week at a distance of between 50 and 60 feet from the shaft, proved to be a boulder ledge.

HARDENBURGH.—A small force is working at present in this mine, for the reason that the company is preparing to make a payment for the property according to the terms of the bond. There is little doubt that the bond will be redeemed.

PIONEER CREEK.—*Amador Record*, June 9: Owing to the late rains, the mining interests in this section have been quite dull, as it was next thing to an impossibility to get the ore from the several mines to the mills. But now that the weather has somewhat settled, things begin to assume a business-like look. At the Brooks-Griesback mine, they are running a new tunnel to tap the mine deeper than it has ever been worked before. This mine has been worked for years, and the owners have every confidence of reaping a handsome reward, as soon as they strike the main ledge. They have a good five-stamp mill. Mr. Geary is going to reopen the Old French mine. South of the Old French mine is the Lester-Kimball. This mine is worked through a shaft to the depth of about 170 feet. The ledge will average about 18 inches in width, but is rather pinched in the last few feet. They have about 70 tons of ore on the dump. This ore is somewhat refractory, and the owners think of sending it to San Francisco or Colorado for reduction. Noah Bowman has about 30 tons of fine-looking ore, and his prospect looks flattering. The old Modoc mine is still idle. East from here is the Stirman-James mine—at present the chief of the district. This mine is worked through a shaft to the depth of about 70 feet. The ledge averages about 20 inches in width. They have at present about 30 tons of high-grade ore on the dump. They, as well as others, claim that they are extracting richer ore at present than has ever been taken from the mine heretofore. If that be true, it is good enough, as their last crushing paid a little over \$127 per ton. They have a fine, first-class, five-stamp mill near the mine. South from here is the "Roaring Water Spout of the Rocky Mountains," owned by Len Harmon and Charles Stirman. At present they are milling their ore. Billy Scott is reopening the North Star.

CRUSHING.—Parties who have been cleaning up the old dump at the New London mine, near Plymouth, had a crushing at the Reeves mill, and last week were rewarded with a gold brick containing \$1082 as a result of their labor. The New London mine was closed down last fall and the machinery moved away, after the expenditure of a large sum by the company, who failed to develop anything satisfactory.

AN IMPROVEMENT.—At the Hector mine, arrangements are being perfected to put in an electric light plant. Knight & Co. are to furnish the dynamo.

Butte.

NEW QUARTZ MILLS.—*Oroville Register*, June 9: From Surveyor B. L. McCoy we gather the following mining items: Mr. McCoy has been up in the hills for some weeks past surveying mining claims, running lines, etc. There are 24 or 25 men at work at the Rainbow mine at Yankee Hill. This is the old Wellington mine, now owned by Capt. Griffith of San Francisco. He and W. T. Coleman will run a ditch, four miles long, from near Sawmill peak to their mines, and use a portion of the water from the Cherokee ditch to run their new mills. A 15-stamp quartz mill will be erected on the Rainbow and another on Mr. Coleman's property, which adjoins this mine on the north. Each mill will be of the same capacity, and there will be an abundance of power for running both mills. Mr. Coleman has lately bonded the Porter ledge and will open the 700-foot tunnel and develop the mine. This is believed to be a rich lode and one that is extensive. On the Rainbow the shaft is down 125 feet and new and improved machinery is being put in for working the ore. The vein is about two and a half feet wide, and as the shaft is sunk deeper the vein grows both wider and richer. Mr. Coleman, on the Christie ledge, has a shaft down 100 feet and the bed of ore shows up well. Yankee Hill promises to be one of the best mining camps in Butte during the present year. At Nimshe's the Butte Belle Co. will run a new level to tap the Indian Spring channel, and the owners believe they have a bonanza. Near Centerville there are 12 Chinese companies working mining land that has been almost constantly worked for 42 years, and yet they get fair returns for their labor.

THE GRAVEL RANGE.—*Cor. Oroville Register*, June 9: Quite a decided stir among mines and mining men is reported from the Gravel Range country. Messrs. Huff and Bunnell opened a small quartz ledge about two years ago in this section, and with untiring perseverance worked it single-handed and alone. Soon it began to yield small but well-filled pockets, a few of which were emptied greatly to the advantage of the provision store in that section. This mine is located near the Butte King, and has recently been purchased by Messrs. Heckart and Parrish, who are putting the property in shape for extensive work during the summer months. Negotiations are already closed for

suitable machinery, which will be run entirely by water power. In the vicinity of the Huff and Bunnell lies the D. K. Perkins mine. The owner, I am told, sets much store by this ledge. It was opened up by Dave Reese, a miner of luck and experience, and purchased by Perkins of Oroville, who has gone at it in a business fashion, as we should expect he would do. The best applications in machinery are placed here regardless of expense, establishing the fact that Butte county quartz property is rapidly rising in the estimation of wise and experienced mining men. There is no question regarding the future mining attractions in this particular section. The Carr mine is again in running order and paying its owner, as it always has, fine dividends. This property is well known both at home and abroad. J. M. De Long is also reported to have struck rich gravel. He believes he has the outlet of the Butte King, being situated about a mile below. Hope he has. Still farther below, a party, headed by Sam Melim of Chico, have another fine prospect. They went into camp at this point with a fine outfit and plenty of good nerve. The John Hupp mine shows fine prospects. Messrs. Boyd & Co. have opened up between the John Hupp and Mineral Springs in a decidedly shipshape way. I have forgotten the name given to the newly developed, but name or no name, it is no doubt a good thing. At Nimshe's, the Blackleg, the Index and the Billy Morgan, as it is usually called, are doing well. Below this point, in the Big Butte, Messrs. Nichols & Co. are piping, with the best of results.

Humboldt.

THE OIL WELL.—*Western Watchman*, June 4: Good reports come from the oil well at East Branch. Letters coming in from Supt. Gillilan to Secretary O'Neil bring the intelligence that on Saturday the well was down 565 feet. At the depth of 545 feet a hard stratum of rock, which dulled the drills rapidly, was encountered and still continues. This is said to be a favorable indication and was expected by Mr. Gillilan. He writes that he feels sure that this rock is the casing, and when the drill shall have gone through it, either salt water, oil or gas will be struck. This company holds 11,520 acres of oil lands. Should the section prove rich in oil, as the surface indications guarantee, there may be 20 flowing wells opened on a single claim, and still the company has left over 11,000 acres for the opening of more wells. As we have said, who can tell where the limit of appreciating value may be? Nearly all the land held by the company is as favorably located as where the well is now being sunk. Should this land prove to be located on the rich part of the oil belt, the limit of development or appreciating value can scarcely be named.

Modoc.

HAYDEN HILL.—*Cor. Adin Argus*, June 4: It has always been my earnest desire to see a tunnel through the Hill, and to determine the correctness of my belief I got two or three companies formed, at different times, with capital stock of \$50,000 each. Disputes of various kinds arose after locations were made, which caused them to abandon the enterprise. Still persisting in my efforts, I gave my views to some local capitalists—men of enterprise and judgment—who took a favorable view of the matter and decided in forming the present company, known as the Hayden Hill Tunneling and Mining Co., whose aim is to thoroughly prospect the Hill to a distance of 4500 feet in length and 1500 feet wide, said mines being controlled and consolidated with the tunnel right, thereby allaying all possibility of litigation and at the same time possessing sufficient virgin ground, whose surface croppings have assayed, in gold, \$7 and \$8 in silver to the ton. The history of the Hill is too well known for me to outline its past records; but, it must be admitted, with few exceptions, that the present form of mining on the Hill is very primitive and in many cases a failure, for all the permanent mines of value are buried beneath the lava-capped crust and beyond the individual prospector's means, and rich men decline to invest until something valuable is struck. We have completed 440 feet of tunnel—dimensions 5 by 8 feet, plenty large to admit of machinery when necessarily demanded. We have also cut through several small veins of quartz, pretty rich, but not large enough to prospect. The Brush Hill mine, formerly owned by Mr. Vanherst, has sold one-half interest to Mr. F. Hose, late from the East, an energetic and enterprising gentleman whose unbounded faith in the Hill is unshaken. He intends to locate another tunnel on the south side of the Hill, and also intends to resume work in his old one, being completed about 800 feet. It will materially aid in developing the Brush Hill mine, and also the Evening Star which he intends to purchase soon. Sain, Sherman & Co. are opening up the Evening Star in good shape, and will soon be rolling out the bullion again. The Golden Eagle is leased by Messrs. Dillon, Richie & Pinebrook, and will commence active operations immediately. Everything is looking favorable for a large output of ore this summer.

Napa.

SHIPMENTS OF QUICKSILVER.—*Calistogan*, June 9: During May quicksilver produced at the mines was shipped as follows: Great Western, 603; Napa Consolidated, 415; Bradford, 296; Sulphur Bank, 130; total for month, 1444 flasks.

Nevada.

IMPROVEMENTS AT THE BRUNSWICK.—*Grass Valley Telegraph*, June 9: Major Fitzgerald, superintendent of the Brunswick, is making many improvements. A new ore bin, capable of holding 60 tons of ore, has just been built at the foot of the dump, a tramway 255 feet in length has been laid, and at the mill the rock breakers have been raised 10 feet and an ore platform, with a capacity of from 10 to 20 tons, has been built at the mill. Self-feeders have been placed at the batteries and a contract has

been let to put in two Frue concentrators with improved hells. There is now about 50 tons of good milling ore on hand. Ore is being taken from the east and west drifts. The four-inch pump has been replaced with a six-inch one and the water is readily handled. The mine is looking well throughout and everything is most encouraging.

GROUND-SLICKING.—*Nevada Herald*, June 9: Samuel Barr is working, on a lease, the gravel property of George C. Gaylord and Robert Sharpe, in New York canyon, back of Marsh's mill on Rock creek. This property would make a first-class hydraulic mine. A tunnel is being run, but is not yet into bedrock. During the spring Mr. Barr has been doing a little ground-slicking, with some success. Last week he found a \$40 nugget. Next fall it is proposed to have more extensive development work done.

AT CANADA HILL.—Canada Hill is quite a busy place just now, and there is considerable prospecting going on. Robert Sharpe is taking some fine looking quartz out of the Greenman ledge, and will soon have a crushing. He works through the Gaylord works, using Mr. Gaylord's hoist. A. Nivens continues work on his tunnel which he has now worked for about four years, and hopes to strike something eventually.

IN WASHINGTON DISTRICT.—*Nevada Herald*, June 9: T. S. Ford of this city owns a quartz ledge in the Washington district which is likely to become a valuable property. It is an extension of the German ledge, and is a wide formation. The ore averages about \$8.50 per ton. Mr. Ford is now making arrangements for erecting a mill on the property.

WILL CONSOLIDATE.—Fritz Meister, the well-known mining man of Washington, is now in this city, and is trying to consolidate his claims at Washington with the Canyon Creek, recently purchased by C. D. Haven of Salt Lake City. There are six or eight claims along this Meister ledge, and the Canyon Creek, we are told, is the key to them all. Mr. Meister owns two claims, and if he can effect a consolidation with the others, a company will be organized and incorporated, and the whole property worked on a large scale. It will make a big mine, as there is a mountain of quartz there, some low grade, some high, and it invariably improves in quality as it goes down.

COOLEY'S LUCK.—M. D. Cooley struck it just right when he pinned his faith in the Garman ledge. He recently got his mine opened, and it fully realized all his expectations. News comes from the East that he has just sold a fourth interest in the German for \$25,000.

SALE OF THE SEVEN-THIRTY MINE.—*Grass Valley Union*, June 11: Negotiations have been going on for some time between the owners of the Seven-Thirty mine and the Evening Star Co., and they were satisfactorily concluded on Thursday night. The Evening Star Co. agrees to purchase the property at the price of \$10,000, a payment of \$2000 to be made on the 1st of August; \$3000 on the 1st of January, 1893, and the remainder in 18 months from the date of the first payment. In the meanwhile the Evening Star Co. is to take possession of and work the mine, and pay 20 per cent of the gross proceeds to the Seven-Thirty mine owners, which 20 per cent to be deducted shall be in installments on the purchase price of the mine. Work on the mine is to be resumed with as little delay as possible.

San Bernardino.

CALICO.—*Cor. San Bernardino Courier*, June 9: At this camp several of the best mines have been shut down, pending a satisfactory adjustment of the silver question, and in consequence business is very quiet. The discontinuance of work on the Waterloo system of mines four months ago caused quite an exodus of miners, but of the men who left, nearly all were single, while those with families remained and obtained employment in the mines still being operated. If silver was at par, this camp would to-day afford employment to 1000 men, and sustain a population of 4000. With the price of silver at \$1 per ounce, population would be trebled. The companies now operating are working ore at as low grade as possible, to be reduced at even a very small profit, and thousands of tons, which, were the price of silver to be raised to the old standard, would be good "milling propositions," are rejected, and either dumped with the waste and lost forever, or placed in separate dumps for future use. The Stebbins mill is making a protracted run. There is sufficient ore for a six weeks' run. The Silver King M. & M. Co. is employing about eight men and reducing 160 tons daily. R. H. Greer and Andrew Hance have just made a cleanup of amalgam from the old Hawley mill, where they have been at work for nearly a month. Goodwin and McDonald have a good pay streak in the Young Waterman and are on the road to a fortune. Work is temporarily suspended in the Bismarck. Thos. Gray and Boh Goldberg are making money leasing the Sul mine. Richard Goldworthy has a good showing on the O. K. mine. The Calico Boreate Co. employs about 20 men constantly on its borax properties, and ships sufficient quantity of the product to supply the demand of consumers at the present price, while carefully avoiding an overproduction, lest the market be crowded and a drop in price result.

San Luis Obispo.

A GREAT SILVER MINE.—*San Luis Obispo Tribune*, June 4: The mining excitement in the northern part of the county, recently reported in the *Tribune*, appears to have a pretty solid foundation, as shown from late explorations. Mr. J. L. P. Smith, an old resident of Las Tablas, and a quartz miner of long experience at Grass Valley, has spent some time in prospecting the new discovery, and informs a *Tribune* reporter that the silver-bearing ledge has been traced and located for 20,000 feet along the easterly side of Pine mountain, show-

ing a width of 20 feet. The vein matter is what the miners call rotten quartz, of a yellow color, encased in granitic country rock. Samples of the ore have been sent to San Francisco for assay, and returns have been received showing a value of from \$68 to \$100 per ton, of which about \$11 was in gold. The ore also contains large quantities of sulphurets. The ore, in general appearance, very much resembles that from the Cruikshank mine, a few miles north, which yielded largely a few years ago. Pine mountain was once famous for its quicksilver mines, and now, if silver is so plentiful as reported, a very convenient combination is at hand. We hope the bright anticipations of the miners may be fully realized. John Bagby discovered the mineral character of the ledge, and an expert from San Francisco has examined it, giving his opinion that it is rich as represented. The country far and near has been "taken up," and people by the scores have claimed the earth, or a liberal share of it, most of whom could not tell the difference between quartz and coal, and have "located" at haphazard without reference to any ledge, or at best as to cover "rock." Naturally, not much outcome is to be expected from boring a hole in porphyry on the summit of the Santa Lucia range, but it is certainly the fact that there is a remarkably protuberant ledge, which shows for three or four miles in length and for 20 feet in width, that in one place at least has been proved to contain very rich ore. There would seem to be a strong probability that elsewhere along the ledge such ore could again be found. A number of parties are vigorously at work on their claims at different points along the ledge, and a short time only will be required to demonstrate the facts in the case.

Sonoma.

PROSPECTING.—*Sonoma Tribune*, June 9: The Leopard mine, a few miles west of Healdsburg, is being tunneled at the rate of one foot per day, and the depth already reached is 193 feet. Boring will be continued on for about 20 days, when it is expected that the rich ledge of gold and silver ore will be struck. Isaac Gray, one of the owners of the mine, had the rock of the ledge on the surface of the ground assayed a few days ago, with this result: Total value per ton, \$542.

Siskiyou.

PAYING WELL.—*Yreka Journal*, June 8:—The McConnell & Quinne claim on Klamath river, at mouth of Humbug creek, is paying very well this season, a rich pay streak having been discovered, with prospect of soon striking the old channel, where exceedingly rich pay is usually found. The Supt., A. Smith, has a large force of men at work, and will continue operations day and night, aided by an electric light plant for night shifts, with expectation of realizing a large amount of gold dust this season. Several Oregon companies have staked out claims on Klamath river, all the way from the mouth of Humbug creek to Cottonwood, and are busily engaged in building head and windmills. The prospects are certainly very favorable for excellent reward for the labor and capital expended. Rich pay was realized near Cottonwood in early days, in the celebrated brass wire claim, and Wm. H. Smith took out in the '50s as high as \$10,000 a day from his Klamath river claim at mouth of Rancherie creek, hence we feel confident that the river is full of glittering dust in the old channel from the mining fields of Siskiyou mountain to the Pacific Ocean. All the placer miners in Quartz Valley and at Mugginsville and Oro Fino, are rushing mining operations with the greatest energy, having a good supply of water from the melting snow on Salmon mountains, for working the giants constantly. Morris & Mitchell, who have a rich bank claim at South Fork of Salmon brought to town last week a large sack of gold dust, which they disposed of at express office. They expect to take out a large pile this summer, if not deprived of the water privilege now being contested in Superior Court with Bennett & Co., who also own rich mining ground in same locality.

NEVADA.

Washoe District.

CONS. CAL. AND VIRGINIA.—*Chronicle*, June 11: 1650 level—Have extracted some ore of fair quality in prospecting west from the upraise, 35 feet above the sill floor, which was carried up 59 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from the winze No. 3 (down 73 feet) in working upward from that point. From the north end of the California ground on the west side are working in the old stopes and extracting therefrom some ore of fair quality. From the bottom of the winze sunk 23 feet in this last locality through the old timbers, a north drift has been advanced 33 feet, and a few tons of milling ore extracted therefrom. 1750 level—In east crosscuts No. 1 and No. 3 from the main south drift, in working upward from the sill floor, have continued to extract some milling ore. 1800 level—Along the south end of the drift running south from the crosscut run east from the winze No. 1 sunk from the 1750 level, we have continued to extract some ore, from the sill floor upward, of milling value. There has been extracted from all parts of the mine during the week 1046 430-2000 tons of ore, which was shipped to the Morgau mill, the average value of which, per car samples, was \$32.24 per ton. The average assay value of all the ore worked at that mill during the week, 980 tons, was \$26.44 per ton, per battery samples. The ore which remained over at the Eureka mill having been transported to the Vivian mill, there was worked at that mill during the week 174 tons, the average assay value of which, per battery samples, was \$23.51 per ton. Bullion on hand in our assay office, assay value about \$16,200.

OPHR.—1465 level—The drift running south 101 feet below the sill floor of the 1465 level

from the Mexican into the Ophir ground, has been extended during the week 15 feet; total length, 88 feet, passing through quartz and porphyry, with some clay which carried assay values from \$2 to \$6 per ton.

MEXICAN.—On the 1405 level, the drift running north from the crosscut ran east from the bottom of the winze sunk 101 feet below the sill floor of this level, near the south boundary of the mine, at a point 40 feet east from the winze, has been advanced 14 feet; total length, 60 feet, continuing in a porphyry formation showing fine lines of quartz and some clay.

SIERRA NEVADA.—West crosscut No. 1 from the north drift through the Kenosha tunnel, 1000 feet in, has been advanced 30 feet; total distance, 153 feet; face in porphyry.

UNION SHAFT.—The joint Sierra Nevada and Union West drift, 900 level, has been advanced during the week 27 feet. Total distance west of shaft, 2081 feet; face is in porphyry and small streaks of quartz.

ANNES.—On the 420 level, west crosscut No. 2, from north drift on east side of the ledge, advanced 27 feet; formation, clay and quartz.

BEST & BELCHER.—900 level—East crosscut No. 1 has been extended 19 feet through porphyry; total length, 213 feet. West crosscut No. 1 has been advanced 22 feet; total length, 305 feet; face in quartz and porphyry.

GOLD & CURRY.—200 level: North-west drift, 435 feet west of shaft, has been extended 15 feet through hard porphyry; total length, 347 feet. 400 level—At a point in east crosscut No. 1, 85 feet from north-west drift, run north 18 feet in quartz giving low assays. On the Suto tunnel level the joint upraise with the Savage Co. has been carried up a distance of 15 feet; face in porphyry and stringers of quartz; total height, 80 feet.

HALE AND NORCROSS.—On the 800 level have started a new east crosscut at a point 50 feet south of our north line; face in porphyry. Also repairing north drift on this level. On the 900 level are stopping out ore above this level and extracted during the week 139 cars of ore, the quality or grade remaining the same as at last report. Are making some necessary repairs to main north drift on this level. 1000 level: South drift from bottom of 900 winze is advanced 20 feet, making its entire length 55 feet. The face of this drift shows some fair ore. Have started a new west crosscut 30 feet north from bottom of 900 winze and advanced the same 30 feet; face all in quartz, but of no value as yet. 1100 level—Are stopping out ore from north and south stopes above this level, and doing considerable prospecting and repairing. Hoisted from this level during the week 200 cars of ore. 1300 level—We continue stopping out ore north and south from north winze; also opening the new working station at head of incline and retimbering main north drift on this level. Extracted from this level during the week 96 cars of ore. 1640 level—Have repaired and cleaned out the main incline a distance of 20 feet the past week, and have now reached the 1700 level. Have men on repairs in main shaft and other places in the mine. During the week have hoisted 435 cars of ore. Shipped to Brunswick mill 437 1270-2000 tons. Average assay of railroad car samples of ore shipped to Brunswick mill during the week, \$20.36; average battery assay for the week, \$15.17.

COLLAR.—Repairing the north drift on the 550 and 750 levels. The north drift from the station, 930 level, has been repaired for a distance of 500 feet.

POTOSI.—Have started a winze 100 feet north of south winze, 1200 level, which is down eight feet. There are four feet of fair-grade ore in the bottom. The joint Bullion winze is down 363 feet below the 1500 level; bottom in low-grade quartz. Extracted and sent to mill in the past week, 412 500-2000 tons of ore from the 930, 1100, 1150 and 1250 levels. Milled during the week, 373 tons. On hand at mill, 80 1200-2000 tons; average battery assay, \$22.48; average car sample assay, \$23. Sent to Carson Mint 480 pounds of crude bullion.

WARN COMBINATION SHAFT.—The joint Alpha and Exchequer south drift from the north line of Exchequer, 1800 level of Ward shaft, has a total length of 136 feet; face in clay and porphyry. The joint Bullion and Potosi north-west drift, from the 1800 level, has a total length of 490 feet; face in hard porphyry.

ALPHA.—The joint Exchequer and Alpha south drift from north line of Exchequer, 1800 level, has a total length of 136 feet; face in clay and porphyry.

EXCHEQUER.—The joint Exchequer and Alpha south drift from north line of the Exchequer, 1800 level, has a total length of 136 feet; face in clay and porphyry.

OCCIDENTAL.—Have extracted from the 350, 400 and 450 levels 200 tons of ore of the average assay value of \$28.55 per ton. Have stopped the prospect work on the 750 level for the present. Milled during the week 120 tons of ore of the average value as per battery samples of \$24.80. The Zagid drift from the Suto tunnel is in 617 feet.

CON. NEW YORK.—The winze in No. 4 west crosscut, 600 level, is down 7 feet; bottom is in fair-grade ore. We are making repairs on the 800 level.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 800 feet; face in porphyry.

OREGON.

A NEW CAMP.—Bedrock Democrat, June 9: A Democrat reporter met Mr. J. E. Meacham yesterday on his return from the Snow Storm group of mines, about midway between Sparta and Sanger. The company of which Mr. Meacham is the representative is what is known as the Snow Storm Con. G. M. Co., composed of Indiana capitalists. The properties of the company are a group of mines, principal of which are the Snow Storm and Lilly White. Mr. Meacham informed the reporter that he has a

large force of workmen engaged in grading a mill site and getting out timbers for a mill to be erected at once at the Lilly White mine, a location selected on account of its adaptability for water power, the waters of the Eagle canal to be used in the operation of the mill. The machinery for the mill plant will be shipped from this city the first of the week. Mr. Meacham thinks he will be able to get the mill in operation about July 1st. The Snow Storm, which is now undergoing extensive development, is making a splendid showing and will certainly produce handsomely.

VIRTUE MINING DISTRICT.—Messrs. Thomas Hoffman and James O'Neil have commenced their contract of running a tunnel 150 feet in length on the Laura mine, in the Virtue mining district. The Virtue 10 stamp mill is in operation on ore taken from the old dump, much of it prospecting very rich. It is expected that the water in the main shaft will be lowered to the pumps the coming week. At present the water is being taken from the shaft by a tank at the rate of 430 gallons per minute. As soon as the pumps can be started the mine will soon be entirely cleared of water and a large force of miners put to work taking out ore. The White Swan mill is running constantly on very rich ore. The placers of Messrs. Baisley and Mulkey, and Borman & Co., are running night and day with a fair head of water. The Hawkeye, owned by Cochran & Co., is producing a good quantity of ore. A tunnel is in 20 feet.

WASHINGTON.

A MOUNTAIN OF ORE.—Okanogan Outlook, June 3: About three months ago, Robt. Allison located a claim on a large quartz dyke in what is known as the Shaker Bend of the Similkameen river and began experimenting with the rock. These experiments were satisfactory, and proved that the whole dyke would pay well to work. He then associated himself with several other gentlemen, and together they located 16 claims, covering the entire cropping of the dyke, which is nearly three-quarters of a mile square. Figuratively speaking, it is a mountain of ore. Some 75 assays have already been made of cropping from different parts of the mountain, with results averaging from \$3 to \$8 per ton. These results were kept secret until about a week ago, when the men who were at work prospecting the property stumbled upon what promises to be one of the richest ore chutes ever encountered in the United States. They had found some rich cropping and begun to sink on it, and had hardly removed the grass when they commenced to take out honey-combed quartz literally full of free gold. News of the strike spread like wild fire, and, in less than 48 hours, nearly every foot of ground for four miles around the claim was staked off by excited prospectors, who flocked in by the hundreds from every section of the country. People have visited the mine by the hundreds during the past week, and every one pronounced it the most wonderful showing they have ever seen. At the time the writer visited the mine, three days ago, they had uncovered the chute for a space of about 44 feet wide by 10 feet long and four feet deep, and nearly every piece of rock taken out shows more or less free gold. It is located just below the Falls of the Similkameen, and extends right down to the water's edge. The locations extend 4200 feet along the river front and 45 feet back into the mountains, and much of the ground can be traveled over with a wagon. Prospectors have known of this dyke for the last 20 years, but considered it worthless.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

HAND-SETTING MECHANISM FOR TIME PIECES.—Arnold Bradley, Cherryvale, Kansas, assignor of one-half to W. P. Hammon, Oakland, Cal. No. 476,515. Dated June 7, 1892. The invention is designed to set the second hands of clocks, watches and other time-pieces by means of a toothed slide or rack-bar and interposed gearing. When the setting has been accomplished, the operator releases his hold on the slide, when a spring operates to force the slide to one side out of engagement with the gear.

BEOLLEE AND TOASTER.—Thos. Barnett, S. F. No. 476,503. Dated June 7, 1892. The object of this invention is to provide a broiler and toaster of a shape and construction adapting it to be readily inserted in the fire chamber of the stove, preferably through a single griddle hole and to rest directly upon the coals, its handle and turn-rod extending upwardly out of the stove top in convenient and cool position, whereby the device may be readily handled both in insertion and removal and reversing while it is in the stove. It consists of a suitably constructed retaining frame connected with its handle by a hinge joint in such manner that it can be readily reversed to turn the material over.

EDUCATIONAL APPARATUS.—Wm. H. Leek, Quincy, Plumas Co. No. 476,568. Dated June 7, 1892. This "educational apparatus" consists of a series of interchangeable vertical rollers, with belts passing around them, a driving mechanism and shafts to which the rollers are removably attached, and a means of exposing either surface of the belt as it passes from one roller to the other. The object of the invention is to provide an apparatus by which a series of mathematical problems, words, sentences or other educational matter may be caused to pass slowly across one or more openings, through which they may be seen during

the time of passage only, for the purpose of inducing the pupil to concentrate his mind upon the problem during the brief time while it is passing, and to correctly catch the combination of figures or words as they pass and rapidly complete the work to be done before another proposition appears. It enables the teacher to instruct a large number of pupils at one time with comparatively little labor, and is valuable from the fact that the pupil must complete each piece of work as it appears before the opening, or lose the opportunity altogether.

WICK ADJUSTER FOR LAMPS.—Alexander J. McAdam, S. F. No. 476,477. Dated June 7, 1892. This invention is adapted for that class of lamps in which a wide wick is employed, and it consists essentially in a vertically-moving or tilting feed-shaft or spindle, the object of which is to tilt the wick in a vertical plane while burning, by raising or lowering one end more than the other. This results in leveling the wick and avoiding the necessity of that careful trimming which is usual to make the flame equal throughout its length. Though the invention is applicable to all lamps, whether for heating or lighting, it is best adapted for a lamp stove.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JUNE 7, 1892.

476,598.—TRAVELING BAG—A. Bancroft, Portland, Or.
476,508.—BEOLLEE AND TOASTER—Thos. Barnett, S. F.
476,601.—WAREHOUSE GANO PLANK—O. J. Boeselager, Mt. Angel, Or.
476,515.—HAND SETTING MECHANISM FOR CLOCKS, ETC.—A. Bradley, Redding, Cal.
476,263.—CALENDAR—J. Guidinger, Los Angeles, Cal.
476,657.—LETTEE BOX—A. N. Klein, S. F.
476,766.—TOUCH REGULATOR FOR PIANOS—F. W. Kringle, Los Angeles, Cal.
476,468.—EDUCATIONAL APPARATUS—W. H. Leek, Quincy, Cal.
476,733.—RAIL JOINT—J. N. Lewis, Conlee City, Wash.
476,287.—SASH BALANCE—J. P. Magney, S. F.
476,477.—WICK ADJUSTER FOR LAMPS—A. J. McAdam, S. F.
476,757.—WELL BORING—G. A. Miller, Colfax, Wash.
476,670.—BICYCLE TIRE—Mitchell & Veitch, Oakland, Cal.
476,482.—PAPER HOLDER—D. F. Oliver, Oakland, Cal.
476,497.—AMALGAMATOR—A. M. Stetson, Oakland, Cal.
476,698.—PESARY—H. H. Taylor, Fresno, Cal.
476,699.—TELESCOPIC FLAP SUPPORTER—C. S. Terpening, Prescott, Wash.
476,500.—CONCENTRATOR—Jas. Tulloch, Angels, Cal.
476,706.—DAM—O. Van Oostrum, Portland, Or.
476,707.—WHEEL CULTIVATOR—F. W. Vaughan, S. F.

The following brief list by telegraph, for June 15, will appear more complete on receipt of mail advices:

California—San Francisco—George W. Parker, floor or roof for buildings and light-transmitting floor or sidewalk; William A. Downing, ticket punch; Wm. B. Frederick, paint compound; Milton R. bumper for vehicle springs; Wm. Skyrme, safety car; John D. Mortimer, Stockton, hotel desk; Jonathan A. Tibbis, San Diego, bass-bar violin, tenor viol and bass viol; George Gales, Jackson, concentrator; Chas. F. Lane, Tulare, washing machine.
Washington—John T. Bibb and A. N. Tucwell, Spokane Falls, automatic sack filling and sewing machine; Charles P. Taro, Spokane, electric railway; Daniel Mentzel, Spangle, brake attachment for the steam wheels of heaters; James W. Fisher, Palouse, car brake.
Note—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.		COMPANY AND LOCATION.		No. AMT. LEVIED, DELINQUENT AND SALE.		SECRETARY.	
Belcher & M. Co., Nevada	4	25c.	May 17, June 27, July 12	4	25c.	C. L. Perkins, 331 Pine	May 17, June 27, July 12
Bullion M. Co., Nevada	33	25c.	May 24, June 24, July 19	33	25c.	R. R. Grayson, 331 Pine	May 24, June 24, July 19
Butte King M. Co., Nevada	8	5c.	June 4, July 11, Aug. 2	8	5c.	W. C. Lewis, 723 Market	June 4, July 11, Aug. 2
Challenge Con. M. Co., Nevada	11	25c.	May 16, June 20, July 12	11	25c.	C. L. McCoy, 331 Pine	May 16, June 20, July 12
Chollar M. Co., Nevada	33	5c.	May 28, June 1, July 27	33	5c.	C. E. Elliott, 339 Montgomery	May 28, June 1, July 27
Con. St. George M. Co., California	5	5c.	June 9, July 14, Aug. 4	5	5c.	T. Wetzel, 320 Sansome	June 9, July 14, Aug. 4
Diana M. Co., Nevada	8	5c.	May 3, June 10, June 30	8	5c.	R. Grayson, 331 Pine	May 3, June 10, June 30
Evening Star M. Co., California	4	25c.	June 7, July 12, July 29	4	25c.	J. J. Scoville, 320 Sansome	June 7, July 12, July 29
Fall River Con. M. Co., California	8	5c.	May 27, July 2, July 27	8	5c.	A. L. Orick, 409 Clay	May 27, July 2, July 27
Golden Gate M. Co., Nevada	12	5c.	May 12, July 13, Aug. 13	12	5c.	G. D. Bennett, 327 Market	May 12, July 13, Aug. 13
Gold & Curry M. Co., Nevada	69	52c.	June 7, July 12, Aug. 4	69	52c.	K. D. Kirtley, 309 Montgomery	June 7, July 12, Aug. 4
Justice M. Co., Nevada	15	5c.	May 2, June 27, July 27	15	5c.	R. E. Kelly, 419 California	May 2, June 27, July 27
Mexican G. & S. M. Co., Nevada	35	25c.	May 16, June 21, July 12	35	25c.	C. E. Elliott, 339 Montgomery	May 16, June 21, July 12
Mexican Photographic and Sulphur Co.	13	5c.	May 18, June 18, Aug. 18	13	5c.	A. Halsey, 328 Montgomery	May 18, June 18, Aug. 18
Ophir M. Co., Nevada	13	5c.	June 3, July 7, July 27	13	5c.	E. B. Hudson, 339 Montgomery	June 3, July 7, July 27
Overman M. Co., Nevada	30	5c.	May 19, June 27, July 11	30	5c.	G. D. Edwards, 414 California	May 19, June 27, July 11
Sierra Nevada M. Co., Nevada	112	25c.	June 10, July 13, Aug. 2	112	25c.	E. L. Parker, 339 Montgomery	June 10, July 13, Aug. 2
Siskiyou Oons Quicksilver Co., California	4	1c.	May 14, June 17, July 19	4	1c.	M. E. Wells, 309 Montgomery	May 14, June 17, July 19
Sunmit M. Co., California	12	5c.	June 21, July 2, July 27	12	5c.	J. W. Currier, 308 Pine	June 21, July 2, July 27
Terliff G. M. Co., California	8	1c.	May 31, July 7, July 29	8	1c.	A. H. Fish, 339 Montgomery	May 31, July 7, July 29
Utah Con. M. Co., Nevada	15	25c.	June 7, July 11, July 19	15	25c.	A. H. Fish, 339 Montgomery	June 7, July 11, July 19
Yellow Jacket M. Co., Nevada	61	25c.	May 9, June 14, July 18	61	25c.	W. H. Blauvelt, Gold Hill	May 9, June 14, July 18

MEETINGS.		COMPANY AND LOCATION.		MEETING, SECRETARY AND OFFICE IN S. F.		DATE.	
Bodie Con. M. Co., California	Annual	H. D. Walker, 309 Montgomery	June 10				
Live Oak D. L. Gravel Co., California	Annual	G. Sessions, 19 Bush	June 12				
North Beale M. Co., Nevada	Annual	J. W. Pew, 310 Pine	June 22				
Sitka M. Co., Alaska	Annual	E. Charron, 420 California	July 1				

LATEST DIVIDENDS.		COMPANY AND LOCATION.		AMOUNT.		SECRETARY AND OFFICE IN S. F.		PAYABLE.	
Bulwer Cons. M. Co., California	10	10	10	10	10	T. Wetzel, 310 Pine	June 10	10	June 10
Champion M. Co., California	50	50	50	50	50	A. W. Havens, 309 Montgomery	June 10	50	June 10
Oons Cal & Virginia M. Co., Nevada	25	25	25	25	25	H. P. Bush, 101 Sansome	June 10	25	June 10
Eureka Con. M. Co., Nevada	25	25	25	25	25	A. Halsey, 328 Montgomery	June 10	25	June 10
Great Western Quicksilver M. Co.	100	100	100	100	100	H. B. Clough, 230 Montgomery	June 10	100	June 10
Pacific Coast Box Co., California	10	10	10	10	10	J. W. Pew, 310 Pine	June 10	10	June 10
Standard Oons M. Co., California	10	10	10	10	10	J. W. Pew, 310 Pine	June 10	10	June 10

Mining Share Market.

SAN FRANCISCO, June 16, 1892.

Immediately following last week's issue of the MINING AND SCIENTIFIC PRESS, mining shares were advanced slightly and kept up until Monday, when they began to set back. On yesterday (Wednesday) lower prices were touched by the shares in the Gold Hill mines than for several years past. The other shares, excepting those in Savage, Hale & Norcross, Best & Belcher, Con. Virginia and Ophir, sold lower than at any time since 1886. Just before the Con. Virginia deal in 1886, Ophir's shares sold at 35 cents, and in the deal they sold up to \$35. Other North End shares, outside of Con. Virginia's, advanced in like proportion from equally as low figures. The Gold Hill and Middle shares sold higher just before the 1886 deal than did the North End shares, but the latter sold the highest in the deal, but in the 1887 deal the Gold Hill shares, under the lead of Confidence and Challenge, sold the highest. There are many shrewd operators who look for similar deals either in the autumn of this year or in the spring of 1893. As we have had several years of strong depression and a steady concentration of stocks, it should not cause surprise if their opinion is well grounded, for at the moment everything is in readiness for a deal. The upper levels of about every mine on the Comstock is well developed to the west, and it is known that from the rich gold-bearing West or Red lode, only three or four mines have extracted much ore. The lode, which is nearly all gold, to the west can be run into on several levels to nearly all the mines with a few days' work. It is undoubtedly the knowledge of this fact that has caused the rings to break mining shares to such low figures, so as to get the last share they can. The rings find that, through the vigilance of the Mining Stock Association, mine-looting has become dangerous, and if again attempted, the leaders may find themselves in different quarters from the luxuriously furnished rooms or houses which they now enjoy.

THE MINING AND SCIENTIFIC PRESS believes in letting bygones be bygones, provided the rings either sell or lease the mills to the mining companies, and also place in positions of trust at the mines men of unquestioned honesty, and also have appointed mine superintendents who are experienced and reliable miners. The most, if not all, of the superintendents have held that position by being both blind and deaf—blind to mine-looting and deaf to the cry of the robbed stockholders. If the members of the rings and directors of the companies will not turn over the mills to the mines and appoint reliable men to superintend them, the rings and directors all should be criminally prosecuted. They cannot plead ignorance. But if, as above stated, they sell or lease the mills to the mines and make other reforms, then those who are now fighting the rings to secure these reforms should withdraw all suits and let bygones be bygones.

It is claimed by persons who should know that the rings have more shares in the Hale & Norcross mine, and to get them cheaply J. L. Flood gave his dummy president instructions not to have any more ore extracted and milled. On several of the upper levels in the mine, experienced miners say there is very rich ore to the west that will pay handsome dividends, provided the mine is honestly worked and the rings are reduced at a mill owned or leased by the company.

Julius Hebbard, in the Fox suit against the late directors of the Hale & Norcross mine, found Alvinza Hayward and H. M. Levy guilty of conspiracy. Attorney-General W. H. H. Hart, one of the directors to represent J. L. Flood in the Hale & Norcross mine, in the Seg. Rich case, of which mine H. M. Levy is vice-president. J. L. Flood is said to have authorized a statement to be published that Alvinza Hayward and he are bosom, or something similar, friends, and yet Attorney-General Hart has been appointed attorney, it is said, by J. L. Flood's directors in the Hale & Norcross, to prosecute Hayward, Levy and others to recover money claimed by them. He has unhesitatingly paid out for lawyers' fees, and also to aid in recovering for the company the \$1,011,000 judgment against Hayward, Levy and others.

Mining men say that the ore in Potosi does not assay over \$20 a ton, and yet the ore milled pulp as high as \$27 a ton. The question naturally presents itself, does the company get rich ore out of Potosi to mix in with that taken out of their own? From all that we can learn, there are surprises in store for the street, and that the old saying, "dead men cannot tell tales," may be proven fallacious, so far as mining on the Comstock is concerned.

News from the outside mines continues favorable, yet men in position to know say that the mine managers are not yet ready to show up much, if any, ore. From the Comstock mines reliable private advices continue uniformly favorable. In each group of mines rich ore can be extracted and the share market made to respond, but for some unaccountable reason only the poorer grades are taken out. The rich ore is extracted and milled, the best of it is probably taken in by the "little jig," for the benefit of the mill rings. In Savage, Con. Virginia, Belcher and Overman the developments are larger and richer than the public is led to believe.

MECHANICAL PROGRESS.

Learning To Be a Mechanic.

The skill necessary to draw a file straight is not easily acquired. Many a weary half hour at noonings and early mornings I have spent in practice with a block of cast iron and a testing straight edge; but the trained muscles at last responded to the desire for straight lines and perfect levels, both in draw filing and cross-filing.

Pertinacious practice gradually taught how to hit the head of a cold chisel when swinging a hammer from the end of an 18-inch handle. The lesson was thorough, adds the writer in the *Mechanical World*, and was not forgotten after the black and blue bruises on the left hand had disappeared. Indeed, nothing that a man learns by this method of instruction, experience, ever leaves him; it is part of himself. That is one reason why old mechanics, even after they have their physical ability impaired by age, are valuable in the shop.

My apprenticeship in a machine shop was under a good workman, but a poor instructor. During the temporary absence of the proprietor, the chart for the only screw-cutting lathe was lost. It was on a paper, tacked to a shingle or thin board, and one breezy summer day was blown out of the window and into the river, on the bank of which the shop stood. It was required to cut some screws in the lathe, eight threads to the inch. The pitch of the leading screw was six threads. Reasoning and thought finally brought about the result that the leading screw should be retarded in its revolutions so that it would travel on its hearing only six-eighths as fast as the blank screws on their centers. Six-eighths is three-fourths; so if a wheel can be put on the spindle of the lathe—the blank screw—that is, three-fourths the power of that on the leading screw, the thing is done. It was already known that an intermediate gear, which was required to drive the blank screw and the leading screw in the same direction, gave only "tooth for tooth," and therefore did not count. An overhaul of the gears was made to find two that bore the relation of six to eight or three to four. Gears relatively with the 45 teeth and 60 teeth would do, these numbers being multiples of 15 by three and four; 60 and 80, multiples of 20 by three and four, would fill the bill, so would the multiples of 30 as 90 and 120. One of these pairs was selected and the screws cut. Never after did the writer care for a lathe chart. Given the pitch of the leading screw, and that can be counted by a pocket rule and a collection of gears, and the combination can readily be made.

There is one other item in learning to be a mechanic that the apprentice should know and remember, and that is that the end of his apprenticeship is only the end of his apprenticeship; he has not "learned his trade," as many claim. The mechanic who "knows it all" is not generally worth shop-room. The practice of mechanics, or science, applied to the useful arts, cannot be fully comprehended and appropriated by any man in the period of his mortal life. He is the best mechanic who has never fully learned his trade.

The Breaking Strain of Wire Joints.

It is an axiom in mechanical designing that the strength of any structure is that of its weakest member, and the application of this rule to electrical work is eminently exemplified in the construction of overhead electrical conductors. Joints are of necessity of frequent occurrence, and hence it becomes all the more important to take special care in order to avoid any weakening of the lines at such points. Beginning with the early days of the telegraph this was well recognized, and from that time until the present, not a little thought has been given to the devising of joints in line wires, with the result that a variety have come in more or less general use. With a view of obtaining independent and reliable information as to the merits of these different types, Mr. Francis W. Jones, electrician of the Postal Telegraph Co., confided to Mr. M. M. Davis the testing of a number of joints. The results published in the *Electrical Engineer* show that in this detail, as in all others in electrical work, care and attention are necessary in order to secure the best results. Some of the joints in common use, like the ordinary unsoldered twist joint, proved to be little more than half the strength of the remaining part of the wire, while on the other hand the Britannia joint gives nearly the full strength of the wire. It should be pointed out, however, that these tests show merely the character of the various joints as related to hard-drawn cop-

per wires, and that in all probability the ratio of breaking strain would vary for different material, as hard-drawn copper wire exhibits peculiarities which are not possessed by iron or steel, or indeed by soft copper.

"HORSE POWER" OF BOILERS.—If the boiler is new, or has never been tested, the heating surface is the best guide to a knowledge of what it will be capable of doing. If the boiler is well designed, and properly set, two pounds of water should be evaporated for each square foot of heating surface, so that, on the Centennial Committee's basis, 15 square feet of heating surface should be allowed per horse power, and in estimating the horse power of a boiler the external surface of that portion of the shell which is exposed to the fire should be estimated, and to this, expressed in square feet, should be added the area of the tubes, and of such portions of the heads as are exposed to the direct heat. The sum should then be divided by 15, and the result is the nominal horse power of the boiler. This rule is not absolute, but, like all other rules, it has exceptions. With the most approved settings, and with well-managed fires, the evaporation is greater than that estimated above, and we find that in such cases 12 square feet of heating surface will evaporate the quantity of water required for a horse power. In some exceptional cases the requisite heating surface is even less than 12 square feet, but we do not use less than 12 unless we have satisfied ourselves, by careful experiment upon similar boilers, similarly set, that we may do so fairly. On the other hand, if the boiler or the setting is poorly designed, or the draught more imperfect, or the fires badly handled, more than 15 square feet may be required. There is no such thing possible as an absolute rule for the horse power of a boiler, and the rule we have above merely represents what, in our experience, a given boiler, well-designed, may be expected to do under ordinary circumstances.—The Locomotive.

THE LARGEST LATHE.—What is claimed to be the largest lathe ever built in this country, and perhaps in the world, has been completed and shipped to the Washington Navy Yard, where it will be used for turning and boring the 16-inch breech-loading rifles. This mammoth piece of machinery is designed especially to permit the use of a broad, flat turning tool, fed at right angles to the axis of the gun, which involves very powerful feeding gear and a quick traverse for moving the tool carriages and slide rests. The bed of the machine consists of a wide part for the head stock, tool carriage and steady rests 73 feet 10 3/4 inches long, 9 feet wide and 2 feet deep, made in two sections bolted and keyed together, and of a narrower part to support the boring bench 54 feet 5 inches long, made in two sections bolted and keyed together and to the main bed. The wide part, or main bed, has four ways, two of which carry the tool carriage on one side, and the other two serve to hold the steady rest and tailstock on the other side. The middle ways are formed in one section of metal, with a diagonal slot between them for clamping bolts. The narrower part or boring bed has no slot, and the boring bench is clamped to it by outside shoes.—Manufacturers' Gazette.

THE HARDENING OF MAGNET STEEL. Samples of different steels were heated in a furnace to various temperatures and hardened in water. They were then magnetized in a coil, and the temporary and the permanent magnetism determined. Both were greatly affected by the hardening temperature, and the effect of differences in the hardening temperature increased with the increase of carbon in the steels. Each steel had a particular temperature, which gave a maximum permanent magnetism—silver steel a little below 900 degrees, tungsten steel 920 degrees and a third sort 850 degrees, etc. When quenched at the temperature which gives greatest permanent magnetism, a magnet is no more liable to lose its magnetism from rough usage than when it has been hardened at a higher temperature.

A VERY large locomotive is now being built at the works of Messrs. Brown, Boveri & Co. at Baden, Switzerland. This engine, says a German contemporary, will be fitted with dynamos of a total of 1500 horse power, but which could be increased up to 2000 horse power. The power will be transmitted to eight electro-motors, arranged on the same number of axles. It is said that this locomotive will attain a higher speed than is usual with steam locomotives, and trials of its capabilities are to be made at the end of the summer.

SCIENTIFIC PROGRESS.

THE MATERIAL CARBORUNDUM.—The possibilities of electric lighting in the future, as expressed in the theories of Nikola Tesla, in connection with the use of the new discovery of carborundum, are extremely expansive and glowing. Electric lamps operated without any wires at all; an inexhaustible store of electrical energy on tap everywhere without need of either generation or transmission; the distribution of 100,000 volts without difficulty; and twenty times the efficiency of our present electric lamps, will be very wonderful things—when they are done. It is a matter of interest to know that such things are expected by an electrician of world-wide fame; but with regard to all such expectations, an ounce of demonstration is worth several pounds of theory. There are more tangible, though somewhat less magnificent, results from the actual development in Western Pennsylvania industries of the new material carborundum, the qualities of which are enlarged upon in the same connection. A material that, in addition to its value for electrical lighting, has the industrial uses set forth in the article, is a valuable addition to our industries. It has been an abstract rather than practical idea in the progress of science for some ages that diamonds might be artificially produced. This discovery seems to realize that dream, and even surpass it, so far as the industrial uses of the precious stones are concerned. It marks another step in the triumphant march of scientific industry.

AN ELECTROLYTIC EXPERIMENT.—In *La Lumiere Electrique* the following electrolytic experiment is described; it is due to Herr Arons, and was shown by him to the Berlin Physical Society: If we place a hollow copper cylinder between the electrodes of a sulphate of copper voltameter, copper will be deposited on the cylinder where the current enters it and dissolved where it leaves. If the cylinder is free to turn about a horizontal axis, it will commence to rotate as soon as the current passes, owing to the surface next the anode becoming weighted. It is possible to arrange matters so that the specific gravity of the cylinder is only a trifle greater than that of the solution, and hence the pressure of its axis upon the supports may be indefinitely reduced. The containing vessel used by Herr Arons was a glass box. The copper cylinder, which occupied nearly the entire width of the containing vessel, was 4.5 cm. long and 10 cm. in diameter, and the walls were about 1.8 mm. thick. The spindle was formed by a glass rod 1 mm. in diameter, secured to ebonite plugs fixed into the cylinder; the spindle rested on ebonite supports, attached to the walls of the containing vessel. The cylinder turned slowly and continuously under the influence of currents varying from 0.1 to 1 ampere. Experiments showed that the speed of rotation was very nearly proportional to the current.

CHLORIDE OF NITROGEN.—Chloride of nitrogen is the most wonderful as well as the most powerful explosive known. For 77 years, from 1811 to 1888, the secret of the composition of this terrible explosive was a mystery. Dulong, who lost one eye and three fingers in the year 1812 in a vain effort to determine its component parts, was the first man of scientific attainments to give the stuff thought and study. Later on, Faraday and Sir Humphry Davy devoted a great deal of time and attention to it. Before entering the laboratory both Davy and Faraday always provided themselves with thick glass masks to protect their eyes from flying pieces of glass, which were most sure to start on a tour of the room whenever a drop of the dangerous stuff was exposed. Faraday once narrowly escaped death as a result of making an experiment with two drops of the yellow, oily agent of death, which he had dropped into a small silver thimble prior to making an experiment, and at another time had his table ruined and the glass mask on his face broken into bits by less than one grain of it. In 1888, as above hinted, Dr. Gattermann of Gottingen, Germany, succeeded in analyzing the mysterious compound. It is the only known substance that will instantly explode on coming in contact with a bright beam of light, whether the beam be from an electric lamp or the sun.—St. Louis Republic.

NEW COATING FOR METALS.—The new coating for metals, based on the remarkable adaptability of cottonseed to unite with lead, has, after a thorough test, been found to give surprising results in resisting the effects of weathering and water. Five litres of cottonseed oil, says the *Pittsburg Dispatch*, are placed in a metallic vessel, and 10 kilograms

of lead are melted separately in an iron ladle. When the lead is molten, which requires a temperature of about 335°, it is poured gradually into the oil, and stirred about so thoroughly that every particle of the lead is subjected to the action of the oil. The mixture is then allowed to cool. When the oil is poured off the lead is found at the bottom, but reduced in weight to 8.5 kilograms, the remaining 1 1/2 kilograms having been absorbed by the oil. The residue at the bottom of the vessel is again submitted to the process of heating and stirring, which is continued five times, after which the maximum impregnation of five kilograms is obtained. When quite cold the oil has the appearance of thick varnish, and is ready for application, either with a brush or sponge. This coating unites quickly and firmly with any material. The first coat should be allowed to dry 48 hours before the second is administered.—Artizan.

ELECTRICAL COMMUNICATION BETWEEN ENGINE DRIVERS AND SIGNALMEN.—With a view of eliminating from the block system of protecting railway trains in transit the element of human fallibility, and thereby rendering it perfect, Mr. S. Lichtenfeld has invented an ingenious system of electrical communication between engine drivers and signalmen. This system we recently saw satisfactorily demonstrated by working models at 93 Great Portland street, London. Mr. Lichtenfeld places at intervals in a block-section insulated bars which are laid between the rails, and are connected by conductors with the cabins at each end of the section. There is also a series of treadles which, like the bars, are electrically connected with indicating and signaling apparatus in the cabins. As the engine passes over each treadle or bar, it makes contact by means of a spring piece fitted under it, and announces its position on the line to the signalman. In this way the signalman is made aware of the precise location of every train on his particular block section at any time. If he wish to stop any train, he communicates with it when it is passing over a bar, a bell on the engine being sounded. The engine driver then pulls up and can talk with the signalman while in contact with the bar. A bell and apparatus are also placed in the front and rear guards' vans, but the control is given to the driver. The system has been inspected by the electricians of several of our leading lines of railway, who are said to have expressed themselves very favorably upon its merits. Iron.

THOUGHT-WAVES.—In a lecture delivered by Prof. E. J. Houston before the electrical section of the Franklin Institute, Philadelphia, that gentleman in an extremely interesting manner attempted to correlate to some extent the phenomena of thought with grosser physical phenomena. On the assumption that thought is accompanied by molecular or atomic vibrations of that part of the brain called the cerebrum, he proposes a hypothesis to account for mesmerism, hypnotism and other cognate phenomena. In support of this hypothesis he cites his own experience, which can be corroborated by many others, that in taking charge of a class as a teacher where a number of bright students are undergoing examination, he experiences great mental exhaustion. He suggests that it is possibly caused by the rapid dissipation of energy by the cerebral radiations being absorbed by the receptive brains of the students, in a manner analogous to the well-known fact that when sympathetic vibrations are being excited by a sounding tuning-fork in a body near it there is greater rapidity of expenditure of energy of the fork's motion than when it was not exciting such waves.

THE TELEPHONE AS A GALVANOSCOPE.—The use of the telephone as a galvanoscope, especially when employed in connection with portable testing apparatus, though often pointed out, has frequently met with unsatisfactory results, owing to the fact that the complete silence which would indicate a balance in the Wheatstone bridge can rarely be obtained. The reasons for this are pointed out by Prof. Brown Ayres. He shows that when employing a circuit breaker we are not dealing with a simple harmonic current variation, but with a complex one, so that if a balance be obtained for one component, there are others still which would give indication of their presence in the telephone. The remedy for this is pointed out, but, unfortunately, cannot be generally applied in practice.

It is now generally held by electricians that the principle of the aurora borealis is the same as that shown by the Geissler tube in which electricity is discharged through rarefied air.

ELECTRICITY.

Electric Light in Lighthouses.

Electric lights in lighthouses, says Prof. Tyndall, are useless in a fog and a nuisance to mariners on clear nights. In the latter case they dazzle the eye and mislead as to distance. In a fog the 7,000,000 c. p. electric light at St. Catharine's Point could not be seen by the North German Lloyd steamer, "Eider," on the night of Feb. 2d at a distance of 3½ miles, and Prof. Tyndall thinks it probable that it would not have been seen in the prevailing dense fog at a distance one-quarter of a mile. This most powerful light in the world was, under the circumstances, no better than the 730 c. p. oil lamp it superseded.

To inform himself of the conditions, the *Engineering News* says, Prof. Tyndall sent a trained observer to the Isle of Wight with the following results: In a thin fog, at a point three-quarters of a mile away, the light gave a dull glow in the fog, which would have been mistaken for moonlight had it not been for the intermittent flashes of the light. As the fog increased in density, the light disappeared entirely, and at 500 yards from the lantern neither direct beam nor glow were to be seen. There was literally no indication of the proximity of a powerful light.

Prof. Tyndall says his own hopes and enthusiasm regarding the electric light have been sobered down by experience. He now strongly indorses the group flashlight of John Wigham of Dublin. In this light, as originally designed, five different processes were employed. The smallest one, for fair weather use, has 28 fish-tail gas jets compactly grouped, and this was increased, as occasion demanded, by groups of 20 jets, to 48, 68, 88 and finally to a larger fog burner of 108 jets. In the case of a revolving light, the larger the burner the wider is the beam sent seaward, and the longer the time occupied by the beam in sweeping past the mariner. So Mr. Wigham takes advantage of this 20 seconds of time by flashing his light, by suddenly quenching and automatically lighting the gas again a certain number of times. Mr. Wigham also removes the top and bottom prisms of the French apparatus, and superposes the central belts of prisms so as to build up a biform, triform or quadriform tower. At the focus of each tier he places his powerful burner, and thus triples or quadruples his light. This light is singularly satisfactory to mariners.

Transmission for Mining.

In a paper recently read before the Colorado Scientific Society, Mr. Irving Hale presents one of the most valuable contributions yet made to the discussion of the problem of the limitations of the distance in the economical transmission of power by electricity—a question which, in the mining regions of the West, is assuming great industrial importance. The world has been afflicted with much arrant nonsense, on this theme, from the mouths of authorities of high reputation who ought to know better, and who probably do know better. Mr. Hale makes a thorough analysis of the whole subject, subjecting it to the logic of cold facts and figures, without romance or guesswork. While freely admitting that under favorable conditions the application of the electric transmission of power in mining is "a successful and highly profitable reality," he strongly deprecates a certain tendency among electricians to look at the problem from a scientific rather than a commercial standpoint. The general conclusion reached by Mr. Hale, and abundantly fortified by the figures adduced by him, is that wherever in a mining district the cost of coal exceeds \$4 per ton, and water power is available at a reasonable cost within a distance of not more than five miles, the installation of an electric power transmission plant presents a very attractive investment for capital. But when it comes to greater distances, Mr. Hale's conclusions are supported by the opinion of an editorial writer in the *Electrical Engineer*, who recently pointed out that there must be an enormous reduction in the present cost of installation and maintenance before electric power from Niagara can be delivered, even no farther away than Buffalo, to compete commercially with steam now manufactured in that city at \$35 per horse power. There is much danger that capitalists may be led astray by visionary and uncommercial projects of this character, and the note of warning uttered by conservative electricians comes none too soon.—*Engineering Magazine*.

ON electric generators, for furnishing the

entire plant, \$50,000 has been saved the World's Fair. The generators must have a capacity of 3500-horse power. Of this amount, 1800-horse power cost \$2.50 per horse power. The remaining 1700-horse power cost \$1 per horse power. While this has not been an actual donation, it comes close to it, considering the fact that the electric combine wanted \$16 per horse power, or about \$56,000 for the plant, which is going to cost \$6200.

Futile Direction of Progress.

Besides the inevitable perpetual motion man, who is beyond reach of any argument or advice, even from his best friend, there is a class of men who are too intelligent to be included among the former, but who, nevertheless, are working in a direction in which a careful investigation would show that their attempts must prove futile from the very nature of the matter. Among these is the primary battery man, who claims to obtain more energy out of his battery than the zinc and solution are capable of giving. This subject, however, has been thoroughly discussed before, and we are pleased to see the number of such misled inventors is rapidly becoming small. But there is another point quite similar, which we fear is not so clearly understood, as we notice that it is occasionally brought out by inventors who do not regard our fundamental laws as being unquestionable, or who do not clearly understand such laws. It is the belief that more than 746 watts can be obtained to the mechanical horse power. The inventors who entertain this idea are misled by the fact that they think this figure 746 (or, more correctly, 745.941) was determined originally by experiments with our present forms of dynamo, and may, therefore, be improved upon by a departure from these forms. This, however, is an entirely wrong impression; any attempt to obtain a larger figure must necessarily be a waste of mental energy, besides involving useless expenditure of money. This number is obtained by calculation pure and simple, depending, therefore, on no experimental determination (other than the value of gravity, which it includes). The value for the mechanical horse power in foot pounds per minute is fixed by definition, as are also the values of the electrical units; this number, 746, is merely the connecting link between the mechanical horse power and the electrical units, precisely as the number 3.2809 is the connecting link between feet and metres, and it would be just as useless to try to get more feet out of a metre as to get more watts out of a horse power. Inventors who are working in this direction had therefore better stop at once and find out how this figure is obtained before wasting their time upon any futile attempts to get what cannot be got from the very nature of the case.—*Electrical World*.

ELECTRICITY ON STANDARD ROADS.—George Westinghouse expresses the opinion that the talk of operating standard gauge roads by electricity instead of locomotives is all "moonshine," and says: "It is a question of centralizing the power economically. Where anthracite coal must be burned, as on the New York elevated roads, it may be found economical to use soft coal to centralize the power. The present locomotives have very nearly the full efficiency of a stationary steam boiler. Now, to put in its place an electric motor connected by structure with a steam plant corresponding to an aggregate of all your steam boiler plants on wheels would be really duplicating your power equipment with but little advantage and no economies, while there is a reduced efficiency by reason of the transmutation of the heat units from the coal through dynamos and wires to an electric motor on wheels. In the present stage of electrical science, talk of the operation of standard gauge roads throughout the country by electric traction is wholly visionary."

INCREASING DEMAND FOR SEAMLESS TUBES.—In regard to the rapid growth in the use of seamless steel tubes, it is stated that Birmingham is the chief center for the manufacture of seamless steel tubes in variety, the increase in the industry being characterized as remarkable. Bicycle makers and engineers are the principal consumers in this line; indeed, wherever metal tubing is required that has to withstand an exceptionally great strain, and where the employment of steel is practicable for the purpose, the seamless tube is increasing in request. It is claimed to have added materially to the efficiency and durability of hydraulic machinery. A three-fourths inch tube with a core of one-half inch can be drawn in steel to withstand a pressure of 1000 pounds on the square inch, and it has now for some time been largely and satisfactorily used for

boilers instead of copper tubing; the cost is said to be considerably less, while its durability is as great, and, in the case of high class steel, its reliability will compare quite favorably with the ordinary copper tube.

USEFUL INFORMATION.

A COMPLICATED INSTRUMENT.—The beak of the mosquito is simply a tool box, wherein the mosquito keeps six minature surgical instruments in perfect working order. Two of these instruments are exact counterparts of the surgeon's lance, one is a spear with a double-barbed head, the fourth is a needle of exquisite fineness, a saw and a pump going to make up the complement. The spear is the largest of the six tools, and is used for making the initial puncture; next the lances or knives are brought into play to cause the blood to flow more freely. In case this last operation fails of having the desired effect, the saw and the needle are carefully and feelingly inserted in a lateral direction in the victim's flesh. The pump, the most delicate of all six of the instruments, is used in transferring the blood to the insect's "stomach."—*Discovery*.

CLEANING BRASS.—The method prescribed for cleaning brass in United States arsenals is said to be to make a mixture of one part of common nitric acid and half part sulphuric acid in a stone jar, having also ready a pail of fresh water and a box of sawdust. The articles to be treated are dipped into the acid, then thrown into the water and finally rubbed with sawdust. This immediately changes them into a brilliant color. If the brass has become greasy, it is first dipped into a solution of potash and soda in warm water. This cuts the grease, so that the acid has full power to act.

WASHINGTON COKE.—Fairhaven (Wash.) coke has met with another successful test, this time in the largest coke-consuming region of the West. Two carloads were recently shipped to Butte, Mont., for trial in smelters. Thomas Couch, superintendent of the Boston & Montana Copper Co., in a letter containing the results of the trial of this coke in the smelters of the company, states that they started with the same quantity and same charge they had been smelting, and attained the same results as had been attained when Pennsylvania coke had been used all the time.

ON the Exposition grounds there will be required steam engines of a capacity of 20,000 horse-power. The combined value of these engines is estimated at \$2,000,000. The Exposition company will secure the use of this plant for \$1. This is only one of many donations. The water for fire protection at Jackson Park will be supplied by four Worthington pumps with a total capacity of 40,000,000 gallons per day. These pumps cost the World's Fair just \$1. Their value is estimated at \$150,000.

IMPREGNATING TIMBER.—An Austrian method of impregnating timber with zinc chloride, known as the Pfister process, consists in fastening an iron cap over the thick end of the newly-felled log, and applying the solution with a force pump. The sap soon exudes at the other end, and is finally followed by the zinc solution. The process requires but a few minutes, but has the defect of distributing the preserving solution rather unevenly.

SOME immense irrigation works are under way in Australia. The Victorian Water Supply Department has made drawings and estimates for a new reservoir which will cost \$1,250,000. The Goulburn Weir, which serves to deliver water to a channel 23 miles long leading to this reservoir, has been already constructed at a cost of about \$500,000, and 15 of the 23 miles of channel have been completed at a cost of about \$1,000,000.

ROSEWOOD.—Many people suppose that rosewood takes its name from its color, but this is a mistake. Rosewood is not red or yellow, but almost black. Its name comes from the fact that when first cut, it exhales a perfume similar to that of the rose; and although the dried rosewood of commerce retains no trace of this early perfume, the name lingers a relic of the early history of the wood.—*St. Louis Globe Democrat*.

AN acid which seems to have a peculiar solvent action upon the oxides and yet leaves the metallic surface intact, is oleic, and when combined with finely-powdered Venetian red and cleaning fluids, it leaves little room for improvement in cleaning and polishing brass.

GOOD HEALTH.

City Dust and Catarrh.

At a recent meeting of the Kings County Medical Association, Brooklyn, N. Y., Dr. W. H. Bennett read a paper (published in the *Sanitarian*) on "Dust and a Polluted Atmosphere as Prime Factors in Causing Chronic Catarrh of the Upper Air Passages." The author says: Considering the exposed position of the parts, it is not to be wondered at that chronic catarrh of the superior respiratory tract, in cities and large towns, is the most common of all affections, both in man and the domesticated animals, even the dogs in the street being not uncommonly affected.

By chronic catarrh of the upper air passages, I wish to be understood as meaning chronic nasal catarrh and chronic nasopharyngeal catarrh, generally coexisting. In my opinion, the principal source of catarrh of the upper air passages is the atmosphere we breathe. Repeated, neglected, acute or subacute attacks undoubtedly play their part by rendering the mucous membrane more vulnerable, and in exceptional cases may even give rise to the disease when the patient is continually exposed, and the parts, in consequence, frequently congested; but it is the filthy condition of the atmosphere we respire that constantly irritates the unprotected mucous membrane, and it is the prime factor causing and perpetuating the hyperæmia, the swelling and the tumefaction—the condition, in short, which we recognize as chronic catarrh.

The atmosphere we breathe is filled with suspended matter of the foulest and filthiest kind, in the shape of dust particles ground from the pavements, ashes, the dejections of animals, the dried and pulverized sputa of a million persons, garbage, dead animals and offal, besides the poisonous gases from ten thousand factories and sewers. Then there is the soil saturated with illuminating gas, which is constantly being given off into the air.

In opposition to all this it may be said that the disease is very generally prevalent over the whole country; but this statement requires qualification. Catarrh is most common in large cities, and the dirtier and dustier the place the more prevalent it is. A changeable climate, particularly if damp, may favor the development of the disease, because there will, in such a locality, be more frequent acute attacks; but it will be found, I think, other things being equal, that the more dust in the air (pulverized filth, I mean, not clean dust) the more cases of catarrh one will meet. The dust of the streets is not alone responsible for the frequency of the disease; we have dust and contaminated air in our houses also, notably in theatres, saloons, ball-rooms, and places where many are gathered, and we must not overlook the poisonous gases resulting as products of combustion from our methods of illumination, from stoves and furnaces, and last but not least, remember the connections with the sewers. Even in the best kept and best regulated houses the carpets, than which nothing better as a receptacle could possibly have been devised for the purpose, will always keep the atmosphere loaded with impurities in the form of suspended matter, every footfall sending it up in clouds. Why is it that clerks and shop-girls in large retail stores all have catarrh, more so than laboring men and those whose occupations keep them out of doors, and consequently in a better atmosphere, if the quality and condition of the atmosphere have nothing to do with it?

There is another circumstance that I would here allude to. During acute catarrhs efforts at ridding the affected parts of the increased secretion, as hawking and blowing the nose, frequently cause abrasions of the membrane. Now even if it be denied that the dust and dirt of a polluted atmosphere, when continuously inhaled, have any influence in creating and perpetuating the disease in its chronic form when the membrane is intact, it certainly must be admitted, it seems to me, that where there is a loss of the epithelial covering at any point, there contact, and especially prolonged contact, with such an atmosphere must tend to aggravate and prolong the acute attacks, which often become chronic where otherwise speedy resolution would be the result.

Again, it frequently happens that an acute catarrh hangs on indefinitely in a subacute form while the patient remains in the city, but disappears at once without treatment on his removal to the purer air of the country. Moreover, it is a common thing to hear persons affected with mild forms of catarrh say that they experience relief in a few hours after they get out of the city into a comparatively pure air.



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Steel Ship-Building.

The iron and steel ship-building interests of San Francisco are in a prosperous condition and steadily growing in importance. The Risdon Iron Works will shortly engage in this branch extensively, and are now making arrangements to establish a plant. In the reorganization of the business of Fulton Iron Works, the ship-building feature will be more prominent than heretofore, though these shops have already done a large share of the marine engine work of the coast.

The Union Iron Works, in the possession of a complete plant by the waterside, with dry dock, launching ways and every appliance for ship-building in all its branches, has now, naturally, the bulk of the work. Having proven their ability to build the types of vessels which compose our new navy, and with a large amount of this work still in hand, they also have facilities for constructing tugs, steamers, etc., for commercial purposes. On Saturday night they launched from their yard a fine steamer for the China line, the largest steel passenger and freight steamer ever built on this coast. Outside of the steel plates used in the hull and boilers, the steamer is the product of California labor from stem to stern. The Peru is 350 feet in length, has a beam of 45 feet and a depth of hold of 27½ feet. The gross tonnage will be about 3615 tons, or 67 tons greater than the steamer City of Rio de Janeiro. The Peru is six feet longer than the Rio and has seven feet more beam. The engines are of the triple expansion type, the six boilers of 2800-horse power, and it is expected with this power that the Peru

will be able to attain a speed of 15 knots an hour. The Rio on her last trip to China attained a speed of 15 knots and the engines and boilers are an exact duplicate of those in the Peru, and were only put in four months ago.

The material used in the construction of the steamer is open-hearth steel made under special survey. There are three decks besides the hurricane deck, five water-tight bulkheads, steam windlasses, steam capstans aft, steam steering gear, and all the latest appliances for the rapid handling of cargo.

There are accommodations for 104 cabin, 75 second-class and 600 steerage passengers. The house on the spar deck, which extends nearly the whole length of the vessel, including staterooms, dining saloon and cabin, is of steel, while the house on the hurricane deck is of wood.

Electric lights have been placed in every part of the vessel. The interior cabins are finished in white and gold.

For cooling the refrigerator room, preserving meats and provisions and supplying ice, an Allen dense air machine has been supplied.

Delegates to the Mining Congress.

Mayor Sanderson has appointed the following gentlemen as delegates to the second session of the National Mining Congress which will meet in Helena, Mont., on July 12th next: W. H. H. Hart, John Hays Hammond, A. H. Boomer, Dr. W. D. Johnston, C. A. Luckhardt, T. R. Church, D. T. Hughes, Louis Janin, A. J. Bowie, Ross E. Browne, W. H. Martin, William Irelan, Jr., John Finlay, Thomas Price, Charles G. Yale (of the MINING AND SCIENTIFIC PRESS), W. S. Lyle, J. F. O'Gorman, Louis Glass, R. McMurray, Dr. E. Mellis, W. K. Aldersley, Paris Kilburn, J. Z. Davis, Isaac Trumbo, Winfield S. Keyes, Alexander Badlam, J. B. Hobson, H. D. Ranlett, William S. Chapman, Egbert Jud-Judson and N. J. Brittan.

This will be the second session of the National Mining Congress, the first session having been held at Denver, Colo., last year. Judge Niles Searles of this State was president of that Congress, and is president of the National Executive Committee. Robert McMurray of California is one of the vice-presidents.

The session next month will last from the 12th to the 16th, inclusive. It is earnestly hoped at this session to secure a complete and thoroughly representative participation in the deliberations of the organization. The potency of the discussion by eminent men of the general needs of our mining interests, cannot be exaggerated as to their helpful influence upon necessary legislation, and the value of interchanged ideas on these matters is unquestioned.

The Congress will convene this year in the very heart of an extensive mining region. The city of Butte is only three hours' ride from Helena, and the entire surroundings present an unparalleled opportunity for practical observation of the operations of mining and the treatment of ores in their highest state of perfection. During this session of the Congress there will be excursions to the cities of Butte and of Great Falls, the latter city being a point of special interest owing to the establishment there of great reduction works, utilizing the immense water power. At this season, too, a trip to the Yellowstone National Park may be enjoyed. The cooperation of all railways in the United States is assured the Congress, and the liberal concession of one fare for the round trip, with interchangeable return tickets from Helena, and 30 days limit in Montana, is announced as available to delegates from all points in the Union. Three transcontinental railway lines center at Helena, and from that point branch roads diverge to all sections of the State.

The Valley County Convention.

A meeting of Sacramento valley farmers, presided over by W. S. Green of Colusa, was held in Sacramento last Friday, when resolutions were adopted denouncing the Caminetti bill, debris dams, hydraulic mining, etc. Several members present endeavored to modify the sweeping resolutions so that they should be within reason, and conform to the understanding reached at the Miners' Convention, but did not succeed. The Committee of Conference appointed by the Executive Committee of the State Miners' Association was not treated very nicely. There was a long discussion as to whether they should be heard or not, and when finally it was decided to hear them, they had gone home. The farmers in convention did not want to hear from the other side, and apparently wanted nothing but their own way. They wanted no experiments with dams, and no bill which would help the miners in any way.

It is worthy of note that those gentlemen present who had attended the Miners' Convention in this city, and had heard both sides of the question, were much more liberal in their ideas than those who had looked at the matter entirely from the anti-debris point of view. Many who were opposed to the Caminetti bill had never read it, and their ideas were based on false premises.

It is useless to waste argument with men who will not see anything except their own side. There is this to say, however: The farmers opposing a settlement of this question now on a fair road to settlement will not be backed up by popular approval when it is seen they care nothing for the good of the State in general, but only for their personal interests. As the Sacramento Bee confesses, "the action of the Sacramento convention will look to the public more like an attack on hydraulic mining itself than a protest against that portion of it which will inflict damage on the valley and rivers. It savors enough of unfairness in spirit to cause an open rupture with the great majority of the Miners' Association who have unquestionably acted in good faith in discontinuing mining and in restraining, to the extent of their ability, their less honest colleagues."

The disinterested public of this State had hoped this conflict between farmers and miners was on its way to settlement without further friction. The people at this convention place the whole matter in a false light, and give rise to further controversy. This is greatly to be deplored, but certain fanatical partisans are not content to have such matters settled unless the advantage is entirely on their side.

A SILVER CONVENTION.—The Executive Committee of the silver clubs of Nevada has issued a call for a State Convention, to be held in Reno June 24th, for the purpose of nominating three presidential electors pledged to vote only for a free coinage candidate.

At a meeting this week of the Regents of the University of California, the offer of a friend of the Lick Observatory to bear the expenses of an expedition to Chile to observe the eclipse next spring was accepted, and arrangements were made for sending an astronomer there next February.

DODGE MILLS.—The Parke & Lacy Co. of this city, sold three Dodge pulverizing mills last week. One goes to Albuquerque, where work is to be carried on by an "electrical process;" another to work free-gold ores at Prescott, Arizona, and the third one goes to Australia.

THE old Vulture mine, Arizona, belonging to Senator Tabor of Denver, is being prospected under the direction of T. E. Farish. A vein of rich ore has been uncovered 300 feet from the old workings of the mine.

Insincere.

Among the resolutions passed by the Sacramento Farmers Convention on Friday of last week, was the following:

Inasmuch as it has been stated that the people of the valley favor, or have no objection, to the erection of dams in the navigable rivers of California, or their tributaries, for the purpose of permitting the resumption of hydraulic mining and in the belief that they will be effectual for that purpose, we solemnly declare that such dams will not restrain the debris that has done so much damage in the past and we are unalterably opposed to the erection of dams for the further prosecution of hydraulic mining. We deny that the engineers of the United States have reported that the erection of dams will restrain the matter that has injured the rivers, and as proof of this assertion we quote their own language, viz:

"These dams, however, will not be effective in impounding all the material delivered into the canyons from the mines. Being in the streams and in the pathway of the freshets, portions of the heavier material will be carried over the crests of the dams, to eventually find lodgment in the river below. The finer sands and clay cannot be effectually impounded by such barriers, but will be carried off in suspension."

This last paragraph from the engineers report has been many times persistently misquoted by professional antidebris agitators, and is again misquoted in this instance.

The exact language of the paragraph in the official report issued by Congress, is as follows:

"These dams, however, will not be effective in impounding all the material delivered into the canyons from the mines. Being in the streams and in the pathway of the freshets, portions of the heavier material will be carried over the crests of the dams to eventually find lodgment in the river below. The finer sands and clay cannot be effectually impounded by such barriers, but will be carried off in suspension. *With the improved condition which it is desired to give to the navigable rivers it is probable that the greater part of this fine material can be carried off without being productive of harm.*"

The italics to the concluding sentence are ours. It will be seen that the favorable conclusion of the engineers is suppressed by the framers of these resolutions, as it has been suppressed in every instance of the kind previously.

Now this is not fair fighting. Explicitly stating that they quote the language of the engineers, and then omitting the conclusion of the paragraph because it is unfavorable to their side, or does not express the opinion they want, is manifestly unjust to the miners, and to their own people as well.

It was never claimed that the finer as well as coarser material could be restrained. The engineers state that it cannot be. But they also state that the results obtained by dams now in existence show the feasibility of impounding the coarser material behind properly constructed barriers. They do not think it possible to prevent the movement of the finer sands and clays except by the construction of settling basins.

To separate the coarser and finer material, the dams must first be built, then the settling basins; but if the farmers prevent the building of the dams, no settling basins will be built.

There is a distinct conflict of opinion between the engineers appointed by the Government and the farmers on the subject of the feasibility of the dams. Whether the general public or Congress will consider that the opinion of farmers, with no experience whatever of dams of any kind, should outweigh that of experienced engineers, is extremely questionable; and the farmers' opinion will surely be considered of little worth when, to bolster up their cause, they misquote the statements of the engineers appointed by Congress to report on this subject.

At a recent meeting of the Harbor Commissioners the plans and model for a new steam tugboat, which were submitted by Contractors Hinckley, Spiers and Hayes, and as modified by the Board, were adopted.

Deep Conglomerate Mines.

After failing to work profitably an amygdaloid bed, the Albany and Boston made the first experiment in 1864 in working a conglomerate bed, and thus, although unsuccessful itself, was the forerunner of the most successful and important enterprise on Lake Superior. The Albany and Boston should therefore appear at the head of the group of conglomerate mines, followed by the Calumet and Hecla, in 1865, and by the Allouez conglomerate only in 1869. The Osceola appeared in 1873, but after working for a time on so much of the remunerative portion of the Calumet conglomerate as lay within its lines, it transferred its operations to an amygdaloid bed. The Tamarack, which tapped the Calumet and Hecla conglomerate on the dip of the great ore chute by a vertical shaft, commenced making copper in 1885, and is the last born of the conglomerate mines.

Several conglomerate beds alternate throughout the series of the Keweenaw rocks with the unaltered traps and with the copper-bearing amygdaloid. In many places they carry traces of copper, but the only conglomerate bed that gives assurance of economic value is the Calumet bed, where, for about three miles along its strike, it outcrops on Calumet and Hecla ground, on the northern edge of Osceola ground to the south, and on the southern edge of Centennial ground to the north (see engraving). In the center of this long stretch, Calumet shaft No. 1 was sunk in what has proved to be likewise the center of the most productive area of this vast chute of ore. Hecla shaft No. 1 adjoins it to the south (for the two companies were distinct until consolidated in 1872).

Within the Calumet lines there have been sunk five shafts, from 1 to 5, numbered from south to north, and within the Hecla and South Hecla lines 12 shafts, numbered from north to south. The disastrous fires of late years crippled the deep, central shafts and shut off temporarily all access to the rich ores of the central zone. But previous to the fire the 700-foot level had been run south to the limit of the Calumet and Hecla property, and had traversed a second chimney of ore in the southern part of the South Hecla, known as the Black Hills section of the mine. With extraordinary energy this almost unexplored territory was opened soon after the first fire occurred, and so rapidly was the work of development prosecuted that, although between the years 1886 and 1887 there was a diminution of product from 22,553 to 20,543 tons of copper, this was due, not to a contraction in the tonnage stamped, but to a decline in the richness of the ore from 4.22 per cent to 3.52 per cent. A large quantity of lean ore from the Black Hills mine, which was necessarily mixed with the richer ores of the central chute, caused the falling off. The next year (1888) showed a still further decline to 3.28 per cent of copper in the rock treated.

The deepest point reached by the Calumet and Hecla is the 29th level, which is 3750 feet from the surface on the incline of the bed. As the dip is $37\frac{1}{2}^\circ$, it makes the vertical depth 2280 feet. This depth corresponds with the fifth level of the Tamarack mine, but the bottom of No. 4, the deepest Calumet and Hecla shaft, is 4000 feet north of the No. 1 Tamarack shaft. It is therefore assumed that the Tamarack is working on the dip of the South Hecla or Black Hills chimney, and not on the central body. The sinking of the Tamarack vertical shaft to a depth of 2270 feet, on the chance of striking the Calumet conglomerate, was regarded from a mining standpoint as an act

of audacity, for when it was begun in 1882, the lower drifts of the Calumet and Hecla were far above the level at which the Tamarack shaft was expected to pierce the lode. But ere the goal had been reached, in 1885, the Calumet's deepest workings were approaching the same level; so that it became a foregone conclusion that the Tamarack hopes would be realized.

The Calumet has virtually opened up a

of three miles, besides the 25 inclined shafts, of which eight are deeper than 3000 feet, there are sunk, or being sunk, seven vertical shafts, the shallowest of which is 2270 feet, and the deepest of which will be 5000 feet."

Ore Masses and Dykes.

The Haile gold mine, in Lancaster Co., S. C., was opened as far back as 1832. The

third of its gold free and two-thirds in sulphurets can be profitably treated. At the Haile mine, 36,000 tons of such ore have been successfully treated, and it is moved and treated at the rate of 80 tons a day. This is the statement made by the inventor of the process, A. Thies, in a paper read before the American Institute of Mining Engineers. The process is not patented, and any one is free to employ it.

The ore at the Haile mines, says Mr. Thies, is a mixture of pyrite and stratified talcose slate. The strike of the strata varies from N. 52° E. to N. 73° E., and the dip (northwesterly) from 45° to 75° . The footwall is soft talcose slate, colored yellowish, brownish and red by iron salts, and showing cross joints. The hanging-wall is often, if not always, greenstone. From the footwall toward the hanging-wall there is a well-marked increase in the hardness of the ore. Bands of silicious matter appear, and veinlets and veins of almost pure pyrite, from the thickness of one-fourth inch to one and one-half feet. These streaks of pyrite cut across the slates in all directions, and are also at times parallel to them. Now and then masses of considerable hardness are also found near the footwall, but whether they occur here or in the vicinity of the hanging-walls, they are evidently derived from the talcose slates. It is believed that whatever be the earthy material mixed with the slates in the ore-bearing mass, it has been derived from the slates themselves. Even the very silicious material found near the hanging-wall, and bearing no resemblance to the slates either in color, hardness or stratification, was doubtless derived from them.

Several dikes, seemingly of diabase, cross the slates at irregular intervals. On the accompanying diagram they are shown as cutting the slates at right angles to their strike. This is not quite true; but the variations are slight. Between these dikes lie the immense deposits of talcose slates, impregnated with gold-bearing pyrite and with more or less free gold. The free gold

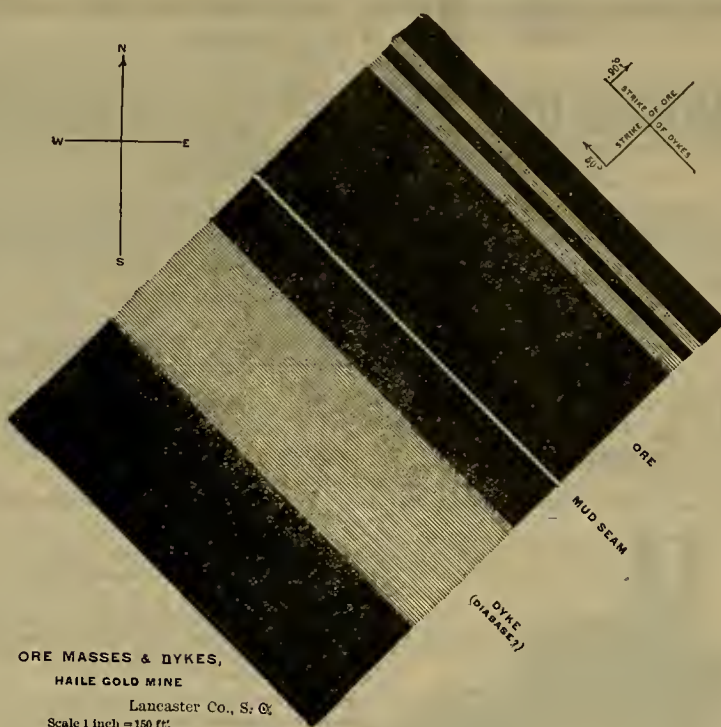
is generally fine. Wherever the slates are rich enough in free gold and pyrite, they are mined. The richer streaks are of various widths, from 2 feet to 30 feet, and are of the same general character as the main body of the slates. In immediate proximity to the dikes, as well as to the hanging-walls, the slates are, as a rule (with some exceptions), richer than elsewhere.

As to the correlation between the dikes and the ore masses, little will be said. That the dikes do influence the richness of the ore favorably seems to be beyond question, but it is not so easy to say why. Nor can we speak positively as to the nature of the dikes themselves.

MINERS COLLECTING PAY AT CREEDE.—Col. H. C. Chapin, president of the Crown Point Mining Co., was held up in his office at Jimtown on Wednesday by three of the company's workmen with a shotgun, who claimed they had not received their pay.

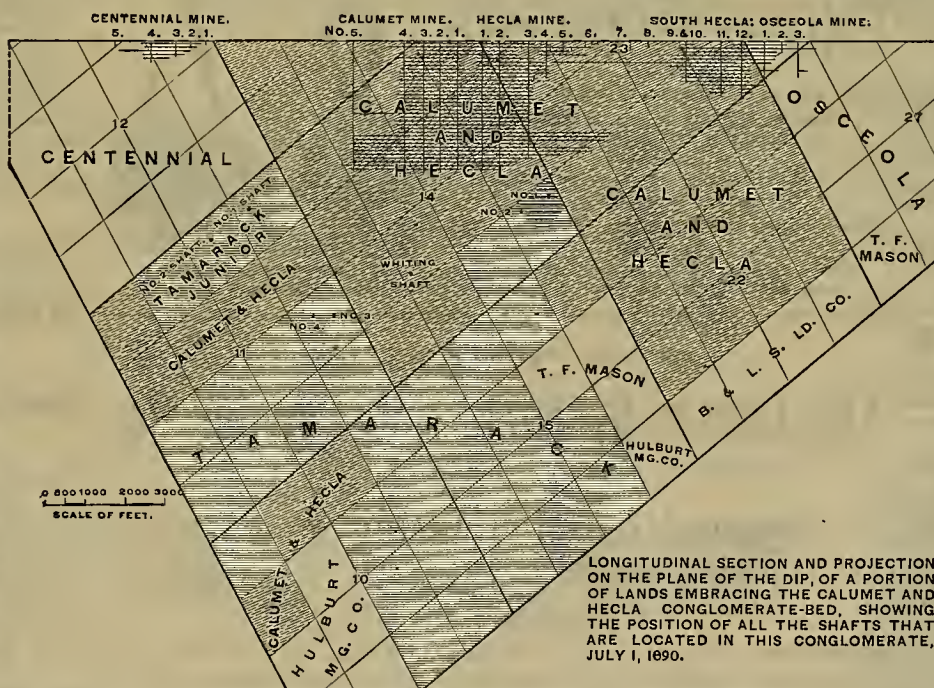
It was after banking hours, and Mr. Chapin had not the ready money. With considerable work, however, he succeeded in getting the cash, and the men departed. Much excitement was caused, and trouble is threatened for several minor companies, whose men have not been paid. Mr. Chapin was obliged to pawn his jewelry in order to raise the funds necessary.

THE CARSON RIVER MINING DRIDGE at Dayton is said now to be succeeding, after several failures in handling the material from the bed of the river. Some of the stuff brought up assays \$149 per ton.



new mine in the South Hecla; it has nearly reached its fortieth level, or a depth of 4000 feet, by its inclined shaft No. 4, and it is sinking a vertical shaft—the Whiting—which will touch the central chute of ore at a vertical depth of 3400 feet, or on the sixtieth level. Meanwhile, the Tamarack is

ore has been worked by various systems, until they finally, in 1888, took up the Thies process of barrel chlorination, by which many thousand tons of ore have been successfully treated. The Thies process is, in brief, the treatment of dead-roasted auriferous concentrates (pyrite, sometimes



LONGITUDINAL SECTION AND PROJECTION ON THE PLANE OF THE DIP, OF A PORTION OF LANDS EMBRACING THE CALUMET AND HECLA CONGLOMERATE-BED, SHOWING THE POSITION OF ALL THE SHAFTS THAT ARE LOCATED IN THIS CONGLOMERATE, JULY 1, 1890.

sinking a third and a fourth shaft, which should both intersect the central chute of the conglomerate at a depth of about 5000 feet; and Tamarack Junior, a company affiliated in ownership with the Tamarack, is sinking to the north of both the Calumet and Hecla and the Tamarack ground, in the hope of finding good ore below the Centennial property, a hope stimulated by the success of that latter company in striking remunerative ground to the north of its older workings.

These facts we take from a paper read by James Douglas before the Am. Inst. M. E., and he adds that "within this limited range

also chalcopryite, as at the Phoenix mine, N. C.) with nascent chlorine, without artificial pressure or exhaust, or lead-lined iron cylinders; the throwing of the mass on a sand filter; the quick filtration and precipitation of the gold chloride with fresh and active ferrous sulphate. The gold is precipitated as metallic gold of a reddish-brown color, which, after being allowed to settle completely, is collected, washed, dried and melted with soda and borax in graphite pots and cast into bars. The efficiency and economy of the process are such that, working on a large scale, crude ore of the assay value of \$4 per ton, carrying about one-

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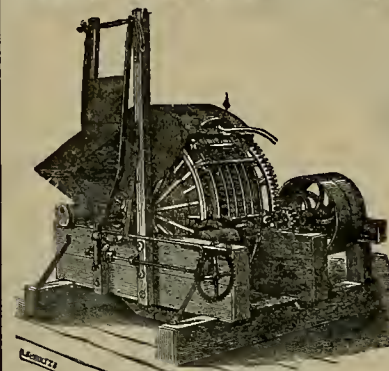
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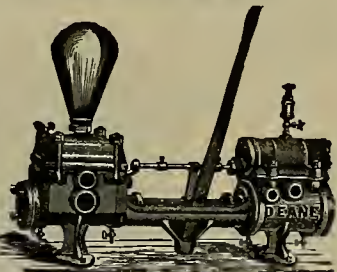
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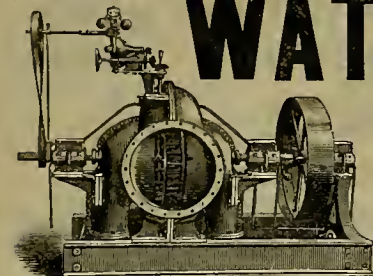
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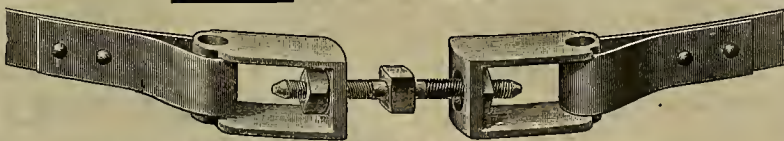
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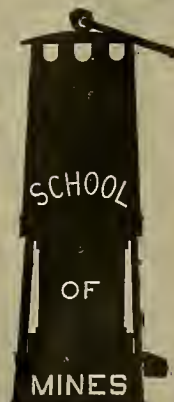
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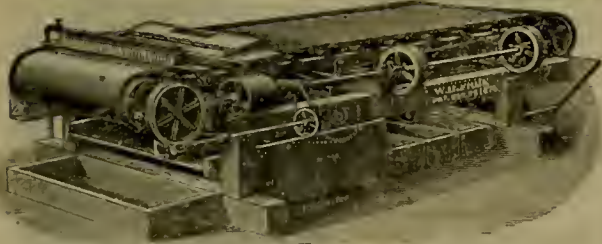
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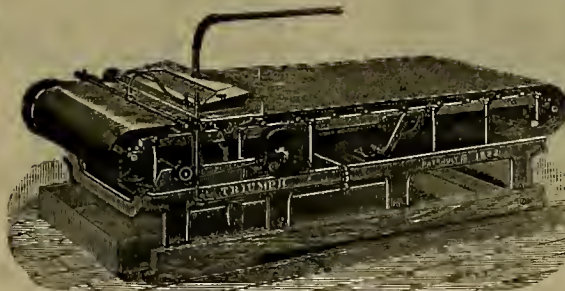
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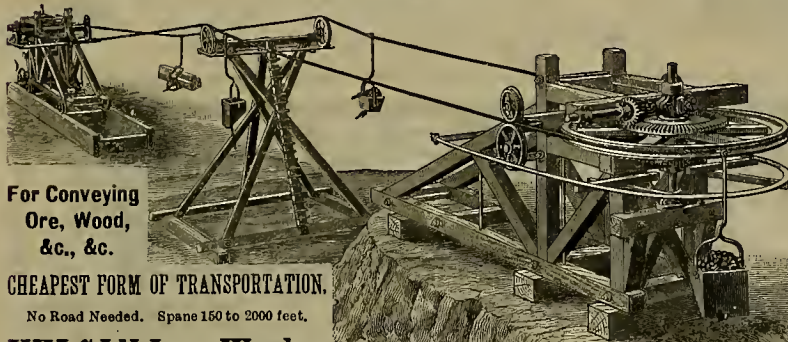
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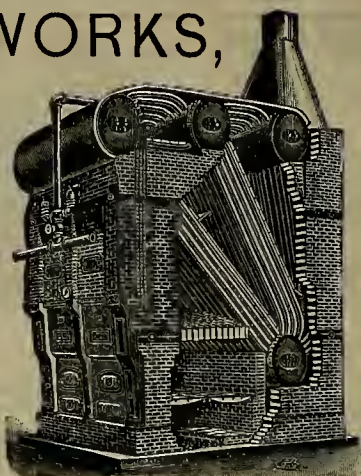
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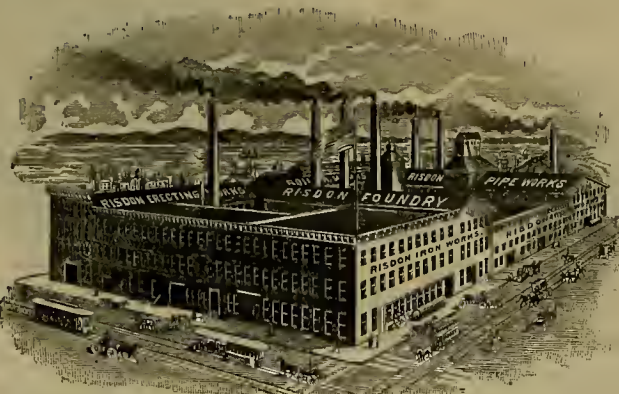
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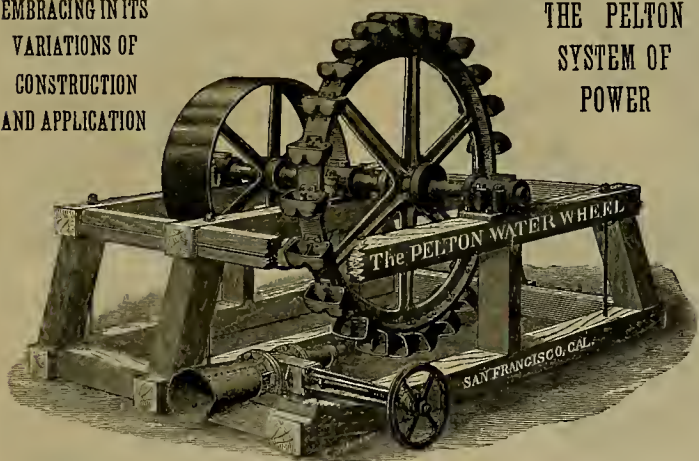
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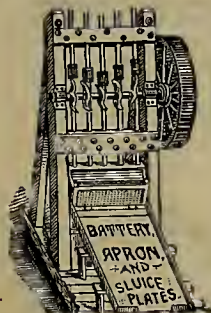
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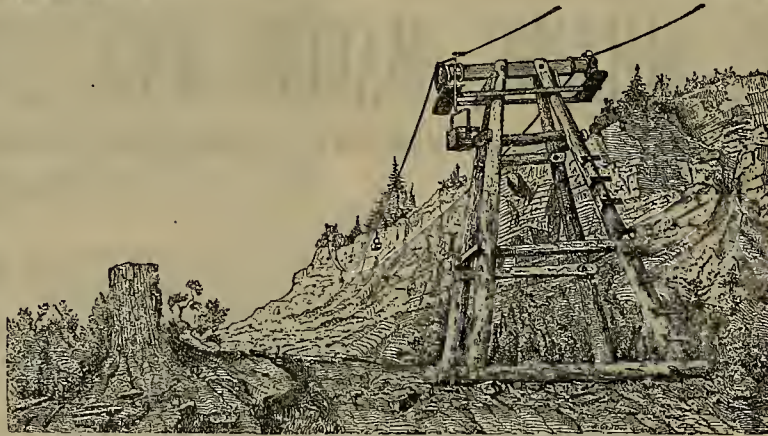
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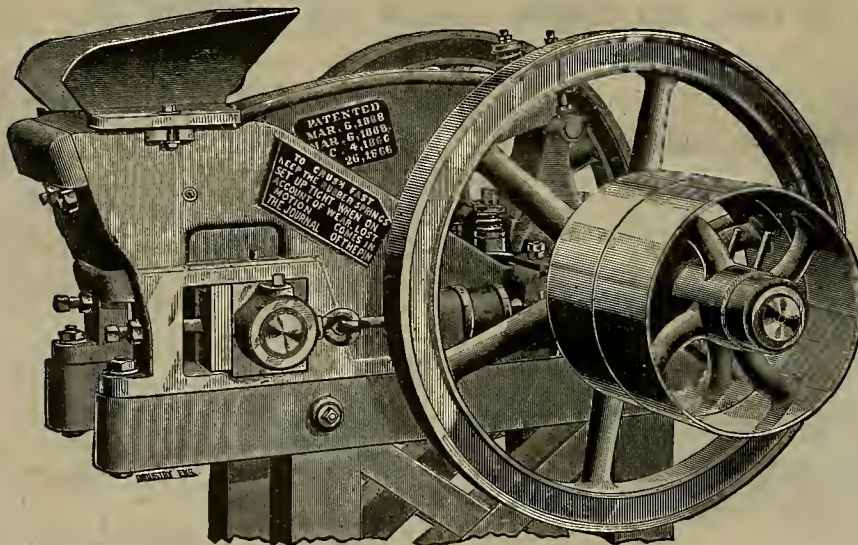
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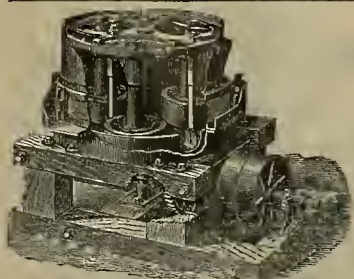
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The Folsom Dam.

Water for Power and for Irrigation.

As long ago as 1866 the foundation was laid for a dam across the American river, at a point about two miles above Folsom and one-third of a mile above the locality where was subsequently located the Folsom State Prison. The work has been continuously in progress, either on the dam or the canal leading from it. In 1868 the State of California became interested in the work, receiving a conveyance of the site for a prison, and a grant of water-power privileges on the canal, at the said prison, in consideration of giving the aid of convict labor in the construction of the dam and canal. It was not until 1881-82 that the State commenced to furnish convict labor, and even then they stopped for awhile during certain litigation. The Folsom Water Power Co. had meantime acquired the property from the original owners and have pushed the work nearly to completion.

Additions to the dam, headgates and retaining wall of section one of the east side canal have made this work one of far greater magnitude than was at first contemplated, entailing a proportionate increase of time in construction.

The dam, headgates and section one retaining walls, down to the location of "State Power House" were, however, finally finished some months since, and are of an extent and stability scarcely equalled by any similar work in the world. For a more full understanding of these works, the following details from the Sacramento Record-Union are instructive:

The height of the dam is 89 feet, width on top 24 feet, width on bottom 87 feet, length 650 feet, masonry contents 48,590 cubic yards. The material is granite blocks of the most solid character, and of the largest dimensions, laid in the best of English Portland cement, of which 20,000 barrels were consumed in the dam and headworks.

The headgates to the east side canal are three in number, each being 16 feet wide. The headgates to the west side canal are also three in number, each 15 feet wide. The

east side canal is 50 feet wide on top, 35 feet wide on the bottom and 8 feet deep. The west side canal is 40 feet wide on top, 30 feet wide on the bottom and 6 feet deep.

The work on the State power house, situated on the State Prison grounds, at the end of section one of the east side canal, designed for the utilization of the power at

The work remaining now to be done, for the completion of section one of the canal, is the construction of the walls, gates, etc., connecting the State power house, both at the inlet and outlet, with the canal; also of a railroad bridge across the canal to give the State access to the prison yard and quarries. This work, it is expected, can be completed

a fall of 35 feet and upward, which would develop upward of 2000 effective horse power were it decided to develop the power here, temporarily, without waiting for the completion of the canal to the Folsom terminus.

It is probable that this course will be adopted, in order to furnish power to the mills and factories of the American River Land and Lumber Co., with whom the Folsom Water Power Co. has made a contract to furnish mill sites, power, etc., on its canal near the Folsom terminus.

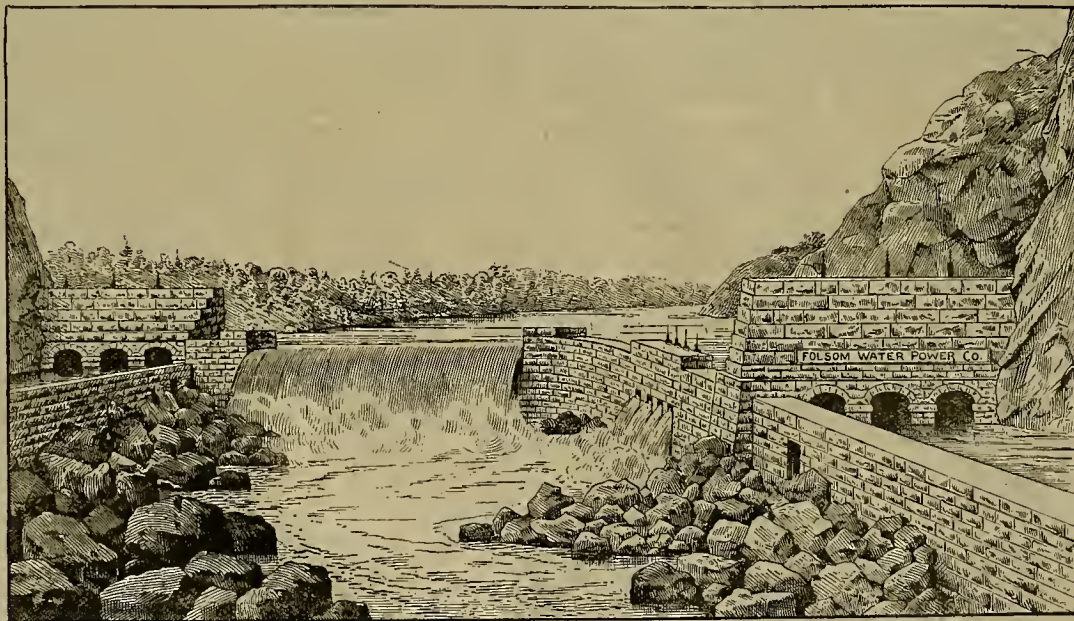
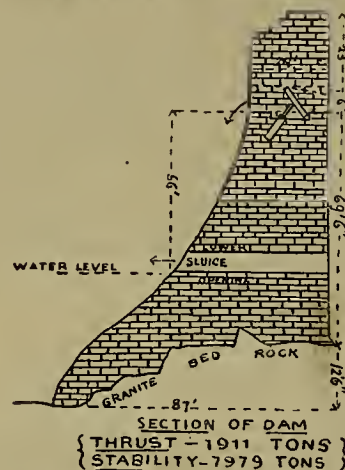
It is contemplated, however, that most of the power will find its market in Sacramento city, transmitted there by electricity, the distance being about 20 miles in an air line.

Arrangements to this end have already been perfected whereby the Sacramento Electric Power and Light Co. will, by contract with the Folsom Water Power Co., receive a large portion of the power of the latter company; and, converting it into electricity, will transmit it to Sacramento city, there to be used for the lighting of the city and furnishing motive power for street cars, and for manufactures of all kinds.

Brilliant as are the advantages thus promised to the near future of Sacramento city and county, resultant from the development of power at the dam of the Folsom Water Power Company, they are of minor importance compared with the benefits finally to be derived from this dam, because of the general irrigation of the entire county, which it renders possible.

The dam is situated 210 feet above the level of the sea, and is therefore about 175 feet above the level of Sacramento city. The basin, or reservoir, above the dam is upward of three miles long, and has an area of 5,850,000 surface feet. The dam is fitted with a timber shutter, operated by hydraulic cylinders, and which, when closed, will raise the water six feet over this entire area, thus adding to the contents of the reservoir 35,100,000 cubic feet of water.

There is thus created a basin, or reservoir, (Continued on page 470.)



DAM, HEAD WORKS, & CANALS of the FOLSOM WATER POWER CO.,
AMERICAN RIVER, CALIFORNIA.

the "State Fall," has occupied the entire attention of the working force for the past year, and has, like the dam and headgates, proved a much larger undertaking than was calculated upon. Not until its completion can the dam and headgates be utilized for the diversion of the waters of the river, since all the water taken into the canal at the dam must pass through the wheels of the State power house, where there is a fall of 7.33 feet, yielding to the State upward of 800-horse power. The State power house proper is now practically finished, and its machinery nearly all placed therein.

in three or four months.

The fall of the American river, from the dam to the Folsom terminus of the canal, is 82 feet, and there will be upward of 70 feet of fall available at the Folsom terminus for power purposes. This will afford 7707 horse power, which, on the basis of 75 per cent actual efficiency of the water wheels, will yield 5770 horse power effective.

Power may also be developed at the end of section one immediately upon its completion. At this point the canal must be discharged back into the river during the construction of section two. There is here

Impolitic Valley Zeal.

The following is the editorial article of the *Sacramento Bee*, commenting on the recent Anti-Debris Convention held in that city:

The representatives of six leading counties touching the Sacramento river, and vitally interested in the mining debris question, in convention assembled at Sacramento, have formally outlined their position as regards hydraulic mining and the Caminetti bill, looking to the resumption thereof, and in doing so have shown a most radical spirit.

This convention was called by a number of Colusa county people, and the conditions and incidents which led up to the call and the convention's actions may be thus summarized:

The valley's position regarding hydraulic mining—i. e., that it must not be continued so long as it injured, in any way, the navigable rivers and their tributaries, or the valley lands—was very positively and definitely outlined at the recent State Miners' Convention by representatives of the valley counties, and gracefully and without restriction indorsed as the legal and just position by the miners. It was understood that this must be the basis of any proposed plan looking to a resumption of this kind of mining, and, as valley and mining papers freely commented upon the matter, he who reads could hardly have misunderstood it.

The Miners' Convention agreed that mining should stop, pending the adoption of a plan by the Government, that would keep the debris out of the streams; but, notwithstanding this agreement and the continuous efforts of the Executive Committee of the State Miners' Association to have it respected (of which the *Bee* has had convincing proof), many monitors have continued to wash the debris into the streams, and in some instances it was delegates to the Miners' Convention who directed such work, and thus broke the pledge.

The so-called Caminetti bill, now before Congress, was devised by the miners, and was claimed by them to aim at securing Government aid and supervision in devising systems of works which would permit a continuance of mining without injury to rivers and valleys. This bill, we infer, would have had the indorsement of Messrs. Ohleyer and Devlin, the valley's delegates at Washington, had there been embodied therein certain amendments suggested by them to cure certain defects which they thought might work injury to valley interests. These amendments, however, were not adopted by the miners, and the news telegrams have carried the intimation that the bill would doubtless pass in its present condition.

As a consequence of continued mining and neglect of the river, the Sacramento, for miles above and below Sacramento city, has become, within the past few months, so choked with debris as to occasion here the highest water ever known. At the same time the upper Sacramento and its tributaries were 10 and 12 feet below high water mark, the American river was not unusually swollen and the lower Sacramento was not high. In consequence, much damage has been done to farming lands in Yolo county in the past few weeks and much more was threatened in this county, and only averted by heroic efforts in guarding the levees. The navigability of the river is also threatened by the diversion of the stream into the Yolo low lands.

Such may be said to be the conditions which induced a call for the Sacramento Convention and which influenced its action.

Now, undoubtedly, it was the duty of the Convention to prominently mention in its enunciation of principles the damage that had been suffered from hydraulic mining, the fact that it was still being carried on to the detriment of river and property, and to call on the proper officials to stop it.

It was the duty of the Convention to reiterate the statement (although continually made by valley and conceded by miners) that no compromise had been effected whereby hydraulic mining was to continue to the detriment of other interests.

It was the duty of the Convention to say—what every one concedes to be true—that dams in the main streams will not keep back all the mining debris, if permitted to come down to them.

It was the duty of the Convention to state that, in its opinion, the Caminetti bill did not properly protect the valley interests, and to demand such amendments thereto as would secure the object desired.

But the Convention went beyond that, and, with a spirit of obstinacy which can work no good to the cause, absolutely declined, on numerous votes, to say what the valley has during the long antidebris fight claimed—that it had no objection to mining

so conducted as to prevent injury to other interests; it declined to state wherein the Caminetti bill was defective, and absolutely refused to withdraw its opposition, if defective or objectionable features were corrected, but demanded the absolute defeat of the bill at the hands of Congress.

The Convention had a right to conduct itself according to its own idea of what was proper courtesy to others, but we believe that its treatment of the gentlemen sent up to confer on behalf of the Executive Committee of the Miners' Association was not in good taste, to say the very least. Those representatives from the other side came from a Convention which had treated the delegates from the farming sections with distinguished and gentlemanly consideration. They came prepared to show that the Miners' Association had acted in good faith, and were empowered to make any amendments to the Caminetti bill that would cure the defects therein complained of by the valley. They met a treatment which, in the bitterest warfare, is not shown by one army to the truce-bearing representatives of the other. The Convention debated for three-quarters of an hour whether it would permit the miners' representatives to appear before it, and when consent was finally obtained it was found that the miners had done the only thing left to self-respecting representatives—they had taken the train for their homes.

The Caminetti bill, from the valley standpoint, is far from perfect, but it must be remembered that its framers claim, at least, that it is intended to permit a resumption of hydraulic mining only under the supervision of the Government engineers, and under conditions in regard to the retaining of debris before it gets into the rivers and tributaries, precisely similar to those under which certain mines have been continuously operated with the consent of the Anti-Debris Association. If a "nigger has crept into the fence," or there are defects in the bill, it would be fair and proper to point them out.

While the *Bee* has been, is, and expects always to be antihydraulic, so long as hydraulic mining does injury to any other interests, it is forced to say with regret that the action of the Sacramento convention will look to the public more like an attack on hydraulic mining itself than a protest against that portion of it which will inflict damage on the valley and the rivers. It savors enough of unfairness in spirit to cause an open rupture with the great majority of the Miners' Association who have unquestionably acted in good faith in discontinuing mining and in restraining, to the extent of their ability, their less honest colleagues. It offers an excuse for them to say: "Since the farmers are determined to crush us, and we get no thanks for abandoning our mines, we might as well hydraulic and let them stop us if they can."

It is calculated to renew all the old bitterness of the past years without accomplishing any good, which could have been more readily and pleasantly accomplished by meeting the Executive Committee of the Miners' Association with a firm but dispassionate statement of the facts and of the changes in the Caminetti bill which would make it acceptable to the valley.

Therefore does the *Bee* deplore the manner in which the convention sought to make its points, and the false light in which it has placed the antidebris fight before the public. While regretting this, the *Bee* occupies the position that it has held for 20 years—it opposes hydraulic mining so long as it injures other interests; it will be pleased to see it resumed only if it can be prosecuted under Government supervision and without injury to rivers and valleys; and in the interests of the State, it will lend its aid at any time to such a consummation.

GERMAN MINERS.—The Government Mine Council (*Oberbergamt*) of Bonn has arranged that the men employed in the Royal mines of Saarbruck shall be represented by delegates regularly elected and called *Vertrauensmänner*, or "men of trust." Mine owners in the district have hitherto repudiated all idea of the miners being represented and having a voice; but the Prussian government, after the strike of 1889, considered it necessary to ameliorate the condition of the men by giving them a *locus standi*. This new measure will permit the miners to make known their views and grievances to the Government Mine Direction, and to express an opinion as to the labor question to the colliery managers. All miners 21 years old, and having worked 3 years, have a vote, and miners 25 years old, having worked 5 years, are eligible as delegates. Every district of a mine in charge of a master miner nominates a delegate, who must belong to the district. The delegates, elected for 2 years, and eligible for reelection, have the mission to (1) discuss with the manager the

wishes and grievances of the men, (2) the conditions of contract between master and man, especially as regards hours of work, (3) make known to the managers the state of well-being of the miners and their families, (4) promote a good understanding among the men, and (5) the observance of their part of the contract, as well as attention to measures for furthering safety and hygiene.

At Harshaw and Washington, Arizona.

"F. B. L." writes to the *Tucson Citizen* of these camps as follows:

During a day's sojourn at Harshaw last week, I noted a few facts which may prove of public interest. The World's Fair mine, merely a prospect one year ago, is one of the most prominent in the camp, coming up to the full measure of expectation on the part of its fortunate owner, Frank Powers. The main shaft is now 90 feet deep, and a tunnel 116 feet in length to connect therewith is being run, and lacks but 10 feet of completion. The first shipment, three months ago, yielded Mr. Powers over \$5000, since which he has made other shipments of smaller lots.

Chas. Powers, G. F. Spencer, J. W. Hubbard and Tom Davies are about to commence on another Hermosa lease. The Hermosa mill has been temporarily closed down awaiting an accumulation of ore. This mill is owned by the veteran miner, James Finley, who is also proprietor of the great mine of the same name, Frank Fitzsimmons manager.

A. J. Matney and R. E. Lee have also a lease on the Hermosa. Wm. Gittens and Charley Hudson are working the Salvador under lease and making some money.

Marrington, Tom Ellis and Capt. Alva-berg have a lease on the January, one of the oldest and best mines in the district. A recent shipment assayed 60 ounces silver and 50 per cent lead.

The Harshaw Silver Club claims a membership of about 100.

There are enormous quantities of ore in this district, which, however, is of too low grade for profitable shipment or for milling on the ground at the present low price of silver. When the tide, which is now against the great silver mining industry, is turned, once more Harshaw is certain to become a booming camp and will last for many years.

There seems to be general opposition here, as in all mining sections I have visited, to the theory of assessing unpatented claims. The validity is not only seriously questioned, but will doubtless be tested in the courts should the tax gatherer attempt to levy for this purpose.

Mining matters are progressing quietly at the Old Mowry, while at Washington Camp, ten miles above Harshaw, I was informed the outlook is better than for some years past. The Holland, which was opened last year by York & Co., is now being worked by a force under C. H. Taylor, employing a bundle and jigs, to which Mr. Taylor has added an improvement by which it is claimed he can do the work on a larger scale and more successfully with a given amount of labor than formerly. It is reported that Roy & Titcomb of Nogales, and others, are interested in the mine, and that a stock company will be organized by them in the near future to operate it.

Since the collapse of the Duquesne Co., three years ago, very little has been done at Washington till recently. The concentrating and milling plant started by this company was never completed. One year ago, however, through the intermediation of D. Bauman and G. H. Brooks, a market was opened up for the refractory ores of the camp. From 150 to 200 tons of shipping ore are now being extracted monthly, whereas this quantity, it is said, may easily be taken out daily, so abundant is it and comparatively easy of access. The ore is sulphide of lead, copper, zinc and some iron, with from 20 to 35 ounces silver. A fair average of the latter ranges from 26 to 30 ounces. The haul to Crittenden costs \$7 per ton freight; to Colorado, \$8, and treatment charge from \$10 to \$11. This is the most prominent ore in the camp. There are also large bodies of similar ore with more rocky matter, requiring concentration for shipment. Another shipping ore is an oxide of zinc, lead and copper, running from 12 to 14 per cent lead, the same in copper, a little zinc and 25 per cent silver. Then there is oxide of copper carrying from 20 to 30 per cent silver. The Belmont, about the oldest patented mine in Arizona, provides a siliceous red ore, carbonate of galena and oxide, running from 20 to 60 per cent lead and 20 to 110 ounces silver, making it a profitable shipping ore, even at the high price of transportation and low price of materials. The names of the shipping mines are the Hol-

land, Pride of the West, Silver Bell and Belmont. A few others make occasional shipments. D. Bauman, manager of the Belmont, told me that Washington district shows as massive ore bodies as even did Leadville, but that the great bulk of the mineral requires concentration at the camp. Experiments, as well as actual work, now carried on with the aid of some of the machinery of the old Duquesne Co., demonstrate that the lead sulphide in the ores carries most of the silver, and will readily concentrate into a 100-ounce product.

In view of the facts stated above, the query might arise, why has this camp not come to the front long ago? To which the reply is easily given that the Cameron grant cloud has rested over the property all these years, and capitalists are loth to develop mines under such circumstances. The stockholders of the Belmont secured an agreement with the grant claimants of non-molestation. All, with this exception, is under the cloud. The prospect is now good, however, that the title will soon be settled; and be it either for or against the grant, the final decision can scarcely result other than favorable to the development of a great mining camp.

The Anti-Debris Resolutions.

The following resolutions were adopted by the Anti-Debris Convention at the recent session in Sacramento:

The people of the Sacramento valley, affected by the results of hydraulic mining on the watersheds of the navigable rivers and their tributaries, in convention assembled, recognizing that the position of the valley has not been correctly represented, do now declare:

First—That the navigable rivers have been almost irreparably injured by hydraulic mining, vast bodies of fertile land adjacent to the streams have been irretrievably ruined, and the prosperity of the valley and its towns and cities has been retarded by the constant fear that their rivers would be filled up by the vast deposits therein of mining debris.

Second—That at no time have the people of the valley consented to the continuance of hydraulic mining, but on the contrary have expended vast sums of money to protect their homes and the navigability of the rivers.

Third—That no concessions have been made or will be made whereby hydraulic mining may be resumed to the detriment of the rivers or the adjacent lands.

Fourth—That, contrary to the law as declared by the courts, various persons continue to mine by the hydraulic process and to dump their tailings into the streams.

Fifth—That we do urgently request the Attorney-General of the United States and the United States District Attorney of the Northern District of California to commence immediately proper proceedings, in the name of the Government, to prevent hydraulic mining to the injury of the navigable rivers of California, and to enforce the laws and decrees provided for their protection.

Sixth—Inasmuch as it has been stated that the people of the valley favor or have no objection to the erection of dams in the navigable rivers of California or their tributaries, for the purpose of permitting the resumption of hydraulic mining, and in the belief that they will be effectual for that purpose, we solemnly declare that such dams will not restrain the debris and suspensory matter that has done so much damage in the past, and are unalterably opposed to the erection of dams for the further prosecution of hydraulic mining. We deny that the engineers of the United States have reported that the erection of dams will restrain the matter that has injured the rivers, and, as proof of this assertion, quote their own language, viz.: "These dams, however, will not be effective in impounding all the material delivered into the canyons from the mines. Being in the streams and in the pathway of the freshets, portions of the heavier material will be carried over the crests of the dams, to eventually find lodgment in the river below. The finer sands and clay cannot be effectually impounded by such barriers, but will be carried off in suspension."

Seventh—The bill recently introduced in Congress by Hon. A. Caminetti is in effect a license for the resumption of hydraulic mining by the United States Government and a rehabilitation of a system of mining placed under the ban by the courts, and suited only to an uninhabitable country, and we are unalterably opposed to its passage, and demand of our Senators and Representatives in Congress that they use every effort to secure its defeat.

Resolved, That an Executive Committee be appointed by the Chair, to consist of fifteen members, including the Chairman of this convention, who shall have full power to take such action as they may deem proper for carrying out the purposes of this convention.

Resolved, That we pledge ourselves anew to resist, with all the power at our command, every and any act and attempt to rehabilitate hydraulic mining on the Sacramento and San Joaquin rivers and their tributaries, to the injury of the rivers and the valleys, and would recommend to the several Boards of Supervisors of the river counties the formation of a State antidebris organization, for the purpose of enforcing the laws and decrees promulgated for our protection; and to that end.

Resolved, That the members of the Boards of Supervisors of the various counties embraced in the call for this convention be requested to meet at Sacramento on the 6th day of August, 1892, at 10 o'clock A. M., for the purpose of consulting and consolidating their efforts in preventing hydraulic mining.

A WALL-PAPER COMBINATION has been formed at New York, and it is expected that a production of 12,000,000 rolls per annum will be obtained.

The Southern Pacific Shops.

The Great Industrial Works at Sacramento.

The Southern Pacific car shops, located at Sacramento, are the largest and most complete in the United States, save those at Altoona, Pennsylvania, and are fully equipped for the manufacture of every item of railroad equipment, either of track, train or motive power, except the making of rails. About 2000 men find constant employment in them, the number frequently going even higher during the busier seasons. Complete locomotives are turned out at the works, among them some of the largest in use on the continent, and probably in the world, and most of the cars in use upon the company's great system are built here.

In a recent number of the *Sacramento Bee* appears a description of these shops. Some idea of the necessity of employing so large a force in the shops and yards may be gained from a statement of the amount of rolling stock in use on the Pacific system of the Southern Pacific, which includes all its lines in California, Arizona, New Mexico, to Ashland in Oregon, Nevada and Utah. There were last summer 737 locomotives in use, including those of the narrow gauge coast road and the six new switch engines just added. There are 80 first-class Pullman sleepers, 900 other passenger train cars, 14,441 freight cars and 340 miscellaneous, including derrick cars, pile drivers, etc. In addition to this rolling stock the company has 17 steamers, 1 steam barge and 3 other barges, plying in the river or the bay as ferry boats, for all of which the main repair work is done here, except in such cases as it is necessary for the boats to go into dock. Besides this rolling stock and steamboat machinery to be kept in repair, so far as the heavier work is concerned, track work, which includes the cutting of rails for split switches, tank and pump work, manufacture of switch stands, etc., is done here. At various other points the company has small repair plants established, but no manufacturing is done except in Sacramento.

THE VARIOUS DEPARTMENT HEADS.

The shops and yards cover an area of about 30 acres, and are divided into various departments, all under the general direction of H. J. Small, Master of Motive Power and Mechanical Department. T. W. Heintzelman is Master Mechanic, and E. M. Luckett, general foreman. Each department is, of course, under its distinct foreman, who are as follows: J. W. Clark, round house; John H. Andrews, machine shop No. 1, and J. G. Camp, machine shop No. 2; Stephen Uren, blacksmith shop; M. A. Baxter, foundry; J. M. Dunigan, boiler shops; Gustav Blauman, copper shops; John Boyd, rolling mill; A. J. Gardiner, pipe shop; E. B. Osler, brass foundry; Benjamin Welch, car construction; Phil Douglas, car repairer, and A. Becker, the yards.

THE ROUND HOUSE.

The round house has 28 stalls, but this number is hardly found adequate to the demand, for there are 80 locomotives in and out per day, and as there are always some which require to lay over for a time for repair, Mr. Clark frequently finds himself pressed for room. On the occasion of a recent visit of a *Bee* reporter to the shops, some monster locomotives were standing in the stalls. The largest was No. 267, a 12-wheeled engine, with 20x26 cylinder and weighing 139,000 pounds. There are 25 engines of nearly similar dimensions, built expressly to run over the Sierra Nevadas on the Central Pacific and the Tehachapi mountains on the Southern Pacific.

THE BOILER SHOPS.

South of the round house is the boiler shop, where as high as 200 men are sometimes employed. The shop is 80x240 feet in dimensions, and is well lighted and ventilated. Boilers for both locomotives and steamboats are made here complete. Any kind of work up to half-inch steel plate can be done. The machinery in this shop is interesting to the spectator because of its power. The planer will bevel the edges of a half-inch steel plate like a carpenter's plane will edge a pine board, the punches put the holes through with as much apparent ease as a sewing machine needle penetrates a piece of cambric, while the shears cut a three-quarter inch steel plate as tirelessly as a country editor gets out his copy.

THE MACHINE SHOPS.

The machine shops occupy the central building of the entire plant, and are in a vast building 100x500 feet in dimensions. In this great room are (two divisions, known as machine shops No. 1 and No. 2. The former is in the northern end of the building

and is where the locomotive repairing is principally done.

Everything here is maintained on the most perfect system. When an engine comes in for repairs, each part of it is looked over by expert machinists. The boiler-maker examines the boiler, the coppersmith inspects the fittings, the pipe fitter goes carefully over the work of his department, and so on. Each makes an estimate of the probable cost of the repairs, which estimates are submitted to the master of the motive department. If it should happen that the cost of repairing is greater than is justified, the locomotive is condemned and run into the "bone-yard," where it is torn to pieces and the cast iron parts sent to the foundry, the wrought iron to the rolling mill, and the brass and copper work to the brass foundry or copper shops. All material that can possibly be worked over is made to do continuous duty, and all the metallic part of an engine, save the steel parts, is recast or worked over in the forges. For the steel parts there are no appliances for working over again here, and the discarded material is disposed of to foundries in San Francisco which make a specialty of such work.

MACHINE SHOP NO. 2.

Is the most interesting of any department of the great plant from the variety of the work done. While No. 1 is devoted to locomotive work, No. 2 does principally track work, and does the repairs for all other departments. Included in the track work is the cutting of rails for switches, the setting of switch stands, the manufacture of pumps, either hand, steam or run by wind-mill, the iron work for water tanks, and, in fact, all work not directly connected with the locomotives. They also build here all the stationary engines, the steamboat engines and iron bridges. The engines of the ferry steamer Piedmont, which plies between Oakland and San Francisco, were constructed here about nine years ago.

It is in this shop that the planing of all the heavy castings and cylinders is done, and the driving wheels of the engines returned and beveled.

THE FOUNDRY.

The foundry occupies a corrugated iron building, 100x400 feet, in the southeastern corner of the yards. It also is composed of two divisions, one being for the casting of the almost infinite variety of forms needed, and the other devoted exclusively to car-wheel making. Each division is complete within itself, having its separate cupolas or melting furnaces, cranes, elevators, etc. There is scarcely a limit to the size of the castings that may be made in the general foundry. The largest that has ever been made was of 30 tons weight. From 18 to 20 tons of iron are now used daily in this division of the foundry in the proportion of about one-quarter of pig iron to three-quarters of old stock.

MANUFACTURE OF CAR WHEELS.

In the car-wheel department there were, at the time of the *Bee* reporter's visit, 40 men employed and 122 car wheels turned out daily. The men work in pairs—a molder and a helper—and each set will make 13 wheels per day. An average day's work for each gang is 11 wheels.

Car wheels are made for the entire system and all its branch roads and for the street railway lines owned by the Southern Pacific Company in San Francisco.

There are used daily about 36 tons of iron and 11,000 pounds of fuel, about 35 per cent of new iron being used to 65 per cent of old wheels. Eighty-five old wheels are broken up each day to be used for the charge. This division is equipped with six hydraulic cranes and an overhead tramway, which carries the ladles of melted iron to any crane desired, for every possible device is used to relieve the men from heavy lifting, and there is practically none of it to do.

THE BLACKSMITH SHOP.

No part of the Southern Pacific's machine shops is more interesting than the blacksmith shop and rolling mill. The principal features of the blacksmith shop are the immense hammers, of which there is one 500-pound steam hammer, three power hammers, two steam hammers made in the shops, one 2500 pound steam hammer, the Sturtevant blowers, two reverberatory furnaces, two large power punches, two pairs of power shears, one engine with 12x16 cylinder, developing 500 horse power, 65 forges and 10 cranes. Here is done all the forging for every department in the railroad system, including all the wrought iron work for the construction of new cars and locomotives, the manufactured articles being shipped to the different divisions of the system as they may be needed. Of the single article of carlinks and pins, 30,000 to 40,000 are manufactured annually.

All the large forgings are shaped out

roughly under the steam hammer before being sent to the forges. There is no new iron used, all being old scrap iron. Much of this is obtained from Europe, ships bringing it as ballast.

Two furnaces and a steam hammer are used for making car axles. This plant has been recently put in and has an output of from 35 to 40 axles daily, weighing about ten tons.

There are from eight to ten tons of iron used daily in the manufacture of bolts, nuts, spikes and rivets. All the bolts and nuts are taken to the machine shop to have the threads cut.

ROLLING MILLS.

In the rolling mills there are three trains of rolls, No. 1 turning out all sizes of iron, from three-eighths of an inch to an inch, round and square, about 16 tons being used daily. Nos. 2 and 3 roll all sizes of flat iron, from one-fourth of an inch to two inches in thickness, and from three-fourths of an inch to nine inches in width. It is here that all shapes are made for bridge and car constructions, also fish plates and all sizes of angles. The output is from 25 to 30 tons daily.

The total amount of iron produced in the rolling mill, from the commencement of operations to 1890, was 92,383,865 pounds, the first rolling being done in 1837.

SPRING SHOPS.

The spring shop is an important feature of the plant, as the springs made here are claimed to be vastly superior to those of Eastern make, the superiority of the Southern Pacific spring being twofold, consisting of difference in shape of the end of the main leaf, which gives greater elasticity, and in a finer tempering than is received by the Eastern spring. By reason of these improvements, a driver spring of the latter make, with 15 leaves and weighing 140 pounds, is replaced by one with ten leaves and weighing but 96 pounds, and a truck spring of 18 leaves, weighing 200 pounds, by one of 15 leaves weighing 135 pounds. Several of the important machines in use in this shop are the invention of George H. Smith, the foreman, as also the tempering fluid in use.

BRASS FOUNDRY.

The brass foundry occupies a portion of the same building in which the spring shop is located. About 6000 pounds of castings per day can be made. Brass, properly speaking, is composed of copper and zinc, but in the work here, to these ingredients are added lead and tin. Old material is used, but about 10,000 pounds of new copper per month are required. From 25 to 30 tons of castings per month are now being made. For bronze castings, copper, tin, lead and phosphorus are mingled. The foundry is one of the best-equipped on the coast, and some very fine work is turned out.

COPPER AND SHEET-IRON WORK.

The copper shop usually employs from 25 to 30 men. Though called the copper shop, all the work is done here in sheet copper, iron and tin. It is the only shop on the system, and all new manufactures, therefore, come from it, though one or two men are kept at the branch shops for repair work. It is also the supply depot for sheet metal, wire and pipe, and, if any such is required elsewhere, a requisition is made on this shop for it. About \$20,000 worth of material is kept in stock. The copper pipe is not made here, but is kept in stock of from one-eighth of an inch in diameter to seven inches. Like all the other departments, this shop is well equipped for all its purposes, and most of its equipments were manufactured at home.

THE CAR-BUILDING SECTION.

The car-building departments are as correspondingly extensive and complete in all their details as the sections previously described, which may well be realized when it is known that all the cars of the system, including passenger coaches, flat, box and combination freight cars, are manufactured here and the greater portion of the repairing also done. Pullman sleepers are purchased from the Eastern manufactory, but all rebuilding comes to the shops in this city. The shops have numerous subdivisions, each under a competent foreman, and nearly one thousand men are employed.

It is hard to estimate the capacity of the car shops, as they have never been pushed to their fullest capacity. Last season there were constructed 25 narrow gauge box cars, 200 flat cars and more than 300 combination cars. An immense quantity of lumber is used annually, probably an average of 4,000,000 feet, but in 1888 the total amount consumed in construction and repairs was 7,460,000 feet.

SOME MINOR DEPARTMENTS.

In this department are included, in addition

to the main car-building shops, the pattern shop, the planing mill, the cabinet shop, upholstering room, dyeing room, upholstering storeroom and sleeping-car equipment room.

There are several smaller departments that space forbids more than mere mention of, such as tin, air-brake and paint shops, etc.

THE REPAIR SHOPS.

Among the most important departments of the great establishment is the repair shop, of which Phil Douglas is foreman. It is located in a room 200x60 feet, and to it are brought for repairs all damaged cars on this portion of the system. Mr. Douglas inspects the cars as well as supervises their repairing, does the babbitting for the whole road, and has charge of the wrecking crew on this division.

A general supply store and shipping department, including all kinds and classes of car material, is maintained.

All the various shops and the yards are kept in the most perfect order, and the utmost cleanliness pervades every department. All possible arrangements for the comfort of the men are provided.

A well-equipped fire brigade has been established, and water is conducted to every part of the yards, so that the danger from fire is reduced to the minimum.

IMPROVED MACHINERY.

Many of the most perfect-working and completely labor-saving devices in use are the inventions of mechanics in the shops, and there are almost innumerable improvements in track and train. Railroad men from the East who visit the great plant in this city are amazed that, away off here—where it is not to be supposed that Eastern improvements would so quickly reach—the necessity, which is the mother of invention, has led to more and greater improvements than can be found upon any system elsewhere in the country.

IMPROVEMENTS PROPOSED.

But extensive as the shops are, and perfect in equipment, they are scarcely adequate to all demands. A necessity for their enlargement already exists. But, fortunately, the company, years ago, foresaw the possibility of such an emergency, and it is announced that shortly the filling up of China slough will be begun. When this work is completed, and the extensions and additions contemplated carried, the Southern Pacific's plant in Sacramento will possibly be the most extensive railroad shops in the United States. Supt. Small stated recently to a *Bee* reporter that hereafter there would probably be 500 or 600 new cars built here annually, as it was the intention of the company to gradually retire all the old-style and small cars and replace them with others of a larger and improved pattern.

THE DEEPEST COLLIERY IN THE WORLD.

While the average depth of French collieries is 1073 feet, that of the coal mines in the Hainault district of Belgium is 1800 feet. In the Mons coal basin the mineral is at present being obtained 3036 feet beneath the surface, and another colliery in the same basin, now abandoned, was worked to a depth of 3860 feet. In April last year, in a mine in the Fleny district, called "St. Henriette des Produits," a rich vein of coal was struck at the extraordinary depth of 4186 feet. This is beyond doubt the greatest depth at which coal has ever been obtained, and, indeed, at which any mineral has been extracted, as the deepest mine in the world is understood to be the rock-salt bore at Spensenberg, near Berlin, which yields the saline product at a depth of 4175 feet. The shaft is not, however, perpendicular, the honor of possessing the deepest absolutely vertical shaft having been claimed by the now disused Kuttenberg mine, in Bohemia, which was exploited to a depth of 3778 feet. The deepest British mine, it is known, is the Ashton Moss colliery, 3150 feet. But the deepest nonmineral sinkings are in America. They are an artesian well at Potsdam, Missouri, and a well which was drilled at Wheeling, W. Va., last year, in a search for petroleum or natural gas. Both these borings attained a depth of over one mile.—Iron.

SMOKE SUPPRESSION.—A test of the combined apparatus of two English inventors for the suppression of the smoke nuisance was recently tried in London. One invention consists of fire-clay arches through which the gases and air are passed. These becoming incandescent, the smoke is consumed. The other invention consists in the introduction of low-pressure currents of air by means of steam jets. The two devices combined are said to have produced excellent results.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLINTON.—Amador Record, June 16: At the Clinton Consolidated, of Wieland, the front ledge has been opened up. The walls are well defined, and next to the foot is a two-foot gouge carrying an assay of \$3 to the ton, while next to the hanging wall there is a vein of fine ribbon rock. The company will no doubt feel greatly encouraged at finding such flattering prospects in the new quarter. At the Belmont mine, work is progressing most favorably in the Boss shaft. Superintendent Tibbits left for San Francisco last Sunday, and while absent he expects to arrange for placing an engine over the shaft so that work can be carried on to a greater depth. W. G. Worf arrived here last Saturday and went over to take charge of the Goodman mine, adjoining Quartz Mountain. He will put on several miners at once and proceed with active work.

SUTTER CREEK.—Cor. Amador Ledger, June 17: Mining continues to improve gradually. Lowering the water at the Hector is progressing. Mr. Valentine states that they have reached the 500-foot level, that the shaft is in very good condition and they hope to continue right along without any serious delay. At the South Eureka things are looking more encouraging. They are in about 100 feet east from the shaft, and the ground is getting softer and quartz is coming in quite plentifully. The west looks still more favorable. They have reached a distance of about 50 feet, and the ground is so loose that timbering is required to make it safe, and quartz is steadily increasing. It appears that north of them for a considerable distance the ledge is divided by what is commonly known by miners as a horse, which makes it certain they have a ledge on the east and west, how far from the shaft is a matter of conjecture, but according to the course already traced both will soon be reached. At the Wildman everything is running like clockwork. The rock is said to be of paying character, and the mill is running at its full capacity.

NEW YORK MINE.—Amador Ledger, June 17: This week we paid a visit to this mine, situated in John Bull diggings, 2½ miles west of Jackson. This property has been held by W. G. Anderson and co-owners for over 15 years, and more or less work has been done each year. We were surprised at the vast amount of work that has been done. One tunnel has been driven 900 feet due west, cutting three distinct quartz ledges. Above the end of this tunnel a vast surface excavation has been made, the formation being porphyry mixed with small seams of quartz. From this point the Huntington roller quartz mill was kept running for months last winter, with what result in bullion yield we are unable to say. This point is over 1000 feet from the mill. Immediately above the mill, however, another tunnel has been run 200 feet, encountering a vast body of quartz. From the tunnel a winze has been sunk 50 feet, in quartz all the way. The mill is excellently fitted up. It is one of the heaviest roller mills, and crushes 25 to 30 tons per day; provided with a rock breaker and every convenience for economical working. All the machinery, including the hoist at the end of the tunnel, is run by water power and by the same water wheel. The water is free, being taken up from Jackson creek by ditches two or three miles in length, owned by the company. Of the paying character of the quartz, we are unable to give an opinion. The ore is different from that met with on the main belt. It carries a small percentage of sulphurets, and we were shown samples showing free gold. The ore is low grade, but the facilities for working it at little expense are unusually good. Everything is idle at present. Nothing has been done for two months. This idleness is on account of some of the stockholders being backward in putting up their share of the expense of putting up the mill and other machinery. Over \$12,000 was spent last year in these improvements. When these financial matters are adjusted, the mill will resume operations. Mr. Anderson has unbounded confidence in the value of the property. The surface shows that the locality was the scene of extensive gravel-mining operations in early days.

KENNEDY.—The sinking of the north shaft has been suspended temporarily, on account of the heavy flow of water. It will be resumed and the shaft sunk to the same depth as the south shaft, as soon as practicable. The mine is looking well. The New York mining papers credit the Kennedy with having paid 30 cents per share in dividends since January last. This is a long way below the mark. The stock belonging to the estate of L. McLaine, consisting of 1000 shares, was sold for \$9000, or \$9 per share, to H. J. Crocker. The shares have sold as high as \$15, but this was considered an extreme value, even when the dividends were from 30 to 40 cents per share per month.

AMADOR GOLD MINE.—James E. Dye paid the taxes on this property last Wednesday, the money being forwarded from London. It is definitely stated that the matter in dispute between the American and English stockowners will be settled finally in a few days. It is to be hoped that this latest rumor may prove correct. So many rumors of expected settlement of the troubles have been circulated that people pay little heed to reports of this nature.

Calaveras.

AT ANOELS.—Cor. Sacramento Record-Union, June 22: At Angels camp, Hayward, Hobart & Lane have been so greatly encouraged by the continually increasing width of the ledge as they go down in the Utica mine that they are

operating others in the vicinity, and are bonding and prospecting still more. They already have a ditch from Murphys large enough to work their present mines, and are talking of bringing electric power to work the Madison mine should developments prove satisfactory. Residents of Murphys told me that the stream above that point has a flow of 5000 inches or upward and a fall of 500 feet. If that is correct, its use means 22,500 theoretical horse power at the fall and 15,000 that could be made available at the mother lode by late discoveries in electric transmission. Four horse power per stamp is as much as the average mill uses for crushing, pumping, hoisting and air-compressing. About half way from Angels to Murphys the present ditch has sufficient fall, that is not used for motive power, to be available for the Madison mine, and some to spare, without going all the way to Murphys to locate an electric plant. If the power available at Murphys should be used to develop mines along the mother lode, with ten per cent the cost of steam power, that Mr. Call finds practical as the result of his work at the Gower mine, it will mean the profitable working of many mines now idle and the opening of many prospects not available by present methods. As the company owning this water has grown up in the mining business from small beginnings to several of the largest operations on the coast, and their policy is to work mines with their private capital so long as they pay, and then move improvements to other places, I look for an immense development in their operations about Angels. They are able to avail themselves of that water power, and when once available, there is little to prevent their working low-grade ores from lower levels at a less cost than almost any place in the country. Mr. Lsne, the resident partner and manager, informed me, quite significantly, that they generally made the Utica yield enough to pay the men, and I gathered from the outside that the mine probably produced in the neighborhood of a million a year. Yet this mine laid idle for many long years in the hands of men who were unable to invest the capital necessary to make it productive. On one side of the county flows the Mokelumne and on the other the Stanislaus, both capable of supplying practically unlimited power, that can now easily be transferred by electricity to points needed. Previous developments make it reasonable to suppose that many another Utica will be opened along the lode as soon as men of capital, nerve and experience are attracted to the advantages awaiting them. At Mokelumne Hill extensive prospecting is going on in the direction of boring for the ancient river channels. Developments are reported very encouraging. As the mines have paid well near the surface, and no one has sunk below 200 feet in that vicinity, it is reasonable to suppose that the lower levels are worth prospecting.

Humboldt.

DISCOVERY OF COAL.—Western Watchman, June 18: Stanley Stevens writes from Ferndale that there has been a discovery of coal on Williams creek, about two miles from Ferndale on the place of Joseph Steves. The vein is eight inches thick on top and widens as they go down. It is pronounced by experts to be A 1 coal. Another report comes of the discovery of coal near Arcata, specimens of which are at the office of G. H. Close. Humboldt is destined to be "in it" somehow. Coal, iron, petroleum are all on the verge of development, which, added to the other great sources of wealth which she possesses, will wake things before long.

Nevada.

STEEP HOLLOW.—Cor. Tidings, June 17: Your correspondent recently visited Hussey's quartz mine at Steep Hollow. Six men are employed. The mill is in charge of Mr. Hogan of Washington. Mr. Hussey says that the mine has paid expenses so far, and the ledge looks more promising. A. B. Everett has returned from Ohio, and is ready to commence work on the Banner mine, in which his son-in-law is heavily interested. The Banner is in the vicinity of Gray's mine, at Fool's Flat. Mr. Foss still has men pushing his tunnel ahead toward Steep Hollow. Jos. M. Blaine is still prospecting his mine on the north fork of Steep Hollow.

MINING AT ROUGH AND READY.—Grass Valley Telegraph, June 17: Around and about Rough and Ready there is considerable mining going on in many ways, including prospecting for quartz and gravel. Much work is being done in the way of picking over the old bedrock that had been washed over and over years ago. As a result of the latter, we saw to-day something like \$300 or \$400 in coarse gravel gold brought to town by Henry Schroeder. The gold was ranging from the size of a large bean up to as large as a man's thumb. One piece shown was just about the size and shape of a man's jaw. All of the gold was very high as to fineness. The nuggets came from different places around the old bedrock lying exposed around Rough and Ready. Mr. Schroeder says also that yesterday several young men were prospecting around what is known as the old Brown diggings on Squirrel creek, back of Rough and Ready. They came across some old decomposed quartz sticking out of the bedrock, and from six pans full of the dirt they took over \$40 in pure gold.

JEFFERSON MINE.—The Jefferson mining location, which is the first western extension of the Osborne Hill mine, and which has been owned by John B. Conlon for many years, has been sold to San Francisco parties, and the first payment made upon it. The purchasers will proceed at once to put up steam hoisting works and sink a shaft on the property.

ROCKY BAR MINE.—A cleannp of a crushing of quartz from the Rocky Bar mine was made at Southern's mill on Tuesday, which turned out finely. There were 45 loads of quartz, which yielded \$65 per load, or an aggregate of

\$2925. The cleannps from the Rocky Bar always give good results.

W. Y. O. D. DIVIDEND.—The W. Y. O. D. Company has declared a dividend (No. 10) of 10 cents per share, amounting to \$3000, making the total of all dividends declared \$24,000.

DELHI.—Nevada City Herald, June 18: At the Delhi, the work of putting in heavy machinery is about to commence. The company are considering a proposition to put in electric power, the only drawback to which is the great power required for pumping. The pumps at the Delhi have to raise 64 inches of water constantly. The new plant will have two ten-inch pumps.

A DIVIDEND.—The Champion has declared a dividend of ten cents per share. This is the result of 15 days' run.

THE OGIN.—Nevada Herald, June 17: At the Ogin, the south drift is being pushed rapidly ahead. Three shifts are worked, about 15 men in all, under the supervision of Carl Hesse. The drift is 20 feet below bedrock, and borings are made occasionally in the top to let the water run out of the old workings overhead, there being acres of ground worked out in the hillsides. The drifters are now blasting through an immense boulder, an unusual thing to find below the bedrock. The drift is intended to tap a bed of gravel left there years ago untouched, and it is expected to reach it in about six weeks.

THREE GOON PROSPECTS.—Eureka Sentinel, June 17: Recently there has been marked improvement in three of the mines of this district. Jas. McBriney and John Berryman have a splendid showing in the north end of the Antelope claim, owned by the Diamond company. They have a lease at that point, on which they have been working for several months. Lately they broke into a cave which promises to yield a large amount of high-grade ore. An important development has also been made in the Alexandria mine, which is under lease to Hartnett and Fraser. They have just cut a very strong feeder of excellent ore. Out on Adams Hill, the men employed in Charlie Wallace's mine have drifted into a face of ore which gives promise of being large and valuable. Nick Barlow, who is working there, gives it as his opinion on that the prospects are first class for a paying bonanza. We are glad to note these several improvements, as it shows that the days of important strikes are not yet over in our district. Eureka, with capital for prospecting, is one of the best mineral sections in the whole mining world.

Plumas.

THE DAURY.—Plumas National, June 9: The mining interest seem to be improving. Standard & McGill have started their mill on ore from the Drury mine. Fifteen stamps are running on good ore, of which a large quantity is developed in the mine. The Johnny Bull mine and mill are being operated, and the outlook of that property has improved very much. D. McIntyre is getting the lumber on the ground at Wolf Creek, to build a 10 stamp quartz mill to crush ore from the Hidden treasure, which he and Archie Warren have been developing during the past three years. In the same locality, Standart & Thompson will soon begin driving a 300-foot tunnel, to tap the back channel of gravel. They report good prospects to begin with. Judge Emmons has resumed the extraction of ore from his mine at Cherokee, and, in a few days, will begin crushing it at the Acadia mill, below the Round Valley reservoir. Good ore is reported in this mine.

CRESCENT.—Work at Crescent proceeds with the usual regularity. The new hoisting-works present a very substantial appearance. From the bottom of the shaft, drifting toward the vein is progressing rapidly. At Green Mountain, all the buildings have been put in first-class order. It presents a very imposing appearance. The work underground continues, and the mill will resume crushing in a few days. Joseph Grus continues work in the Genesee mine with varying success. Sometimes he has very rich ore.

Tuolumne.

NOTES.—Independent, June 17: It is said that Dixon & Mawr took out a pocket of \$200 on Nolan's ranch about two weeks ago. The Ham & Burney mine, near Columbia, will shortly be reopened by the Leechman Prospecting Co. George Mapes has put up a small mill at his Shanghai mine at Yankee Hill, and will shortly commence crushing. Warner, Digley, Woodside and Endicott, of the Noonday mine, have their mill about ready for work. They have considerable rich ore in the bin. Some parties are mining opposite the Keltz mine, and have recently struck good ore. They will pack it on burros to Riverside mill to crush. Victor Guist and partner are prospecting near the Keltz mine, and have found some rich float rock. The soil is deep, but they hope soon to locate the vein. Several good prospects have recently been found in the vicinity of the Noonday. The richness of the latter mine induced prospectors to look into the matter. The Little Gem mine, south of town, has been bonded to J. F. O'Gorman, and water is now being pumped out of the shaft preparatory to the commencement of other work. J. F. Bluet intends shortly to recommence work on the Old Riverside claim, about ten miles above Columbia. It is low-grade ore of large body. It runs all the way from \$1 to \$10 per ton. A young man who has been pocket-mining in the edge of town, last week, found a pocket said to be worth about \$1500. He found \$2000 on the same vein once before. He would not consent to have his name published. John O'Hara is cleaning out the old Rother claim, on Bald mountain, and will work it for all it is worth. Rother knows how to find it. He has mined on the hill for many years, and has taken out several pockets—one of \$6000. We were shown a piece of ore this week from the Otto Kanig mine, which is situated on Bret Harte's "Ra-

ging Stanislaus." The specimen was a sort of decayed quartz and full of free gold. Several Columbia parties are interested in the mine. The Keltz mine is now running in full blast. New claims have been put in the mill. They have a very fine chute of ore, both large and rich. They recently put in a Dodd wheel, and report that whereas they formerly used 17 inches of water, they now do the same work with 104 inches. The Bonanza Mining Co. is having over 3000 feet of pipe laid, with which to bring water to the mine from the Street ditch. Part of the pipe will be 11-inch and part 6-inch. The water will be used for power with which to operate pumps, air compressors, etc. A gentleman has been tunneling under a table mountain in a quiet little nook for about four years past, and found the pay gravel of the ancient river bed shortly after commencing work. He has been taking out considerable gold for several years, and now lives like a prince. He keeps that matter very quiet, and very few know who he is or where his mine is. Wm. Sharwood commenced recently to prospect a mine at Cherokee called the Porto Fino. He has got into a vein varying from six to ten inches in width, and running from \$60 to \$70 per ton. He will haul the ore to the mill at Soulsbyville to crush.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—Virginia Chronicle, June 18: 1500 level.—From the south drift at point of connection with the old stopes we continue to extract some ore and fillings of average milling value. 1600 level.—We have continued prospecting upward from the old sill floor of the old stopes, from which some ore of fair quality is being extracted, and some very good ore has been taken out along the ore streak on the east side of the old timbers. 1650 level.—Have extracted some ore of fair quality in prospecting west from the upraise 35 feet above the sill floor, which was carried up 59 feet above the southwest drift. Ore of fair quality has been extracted from the drift run east from the winza No. 3 (down 73 feet) in working upward from that point. 1800 level.—Along the south end of the drift running south from the crosscut run east from the winza No. 1 sunk from the 1750 level, we have continued to extract some ore from the sill floor upward of milling value. The crosscut running east from the bottom of winza No. 2, sunk from the drift run north from the crosscut run east from the bottom of the winza No. 1 before mentioned, has been extended 30 feet; total length, 59 feet into east country formation. From that east crosscut from winza No. 2, at a point 12 feet in, a north drift has been advanced six feet in a quartz formation carrying a low assay value. There has been extracted from all parts of the mine during the week 1034 1280-200 tons of ore, which was shipped to the Morgan mill, the average value of which, per car samples, was \$34.61 per ton. The average assay value of all the ore worked at that mill during the week, 980 tons, was \$28.38 per ton per battery samples. There was worked at the Vivian mill during the week 223 tons of ore, the average assay value of which, per battery samples, was \$23.89 per ton. Bullion shipped to Carson Mint, assay value, \$30,824.60. Bullion shipped to the company's office in San Francisco, assay value, \$1,996.30.

OPHIA.—1465 level.—The drift running south 101 feet below the sill floor of the 1465 level, from the Mexican into the Ophir ground, has been extended during the week 16 feet; total length, 104 feet, passing through a mixed formation of porphyry, clay and quartz which carried a very low assay value.

MEXICAN.—On the 1465 level the drift running north from the crosscut run east from the bottom of the winza sunk 101 feet below the sill floor of this level near the south boundary of the mine, at a point 40 feet east from the winza, has been advanced 21 feet; total length, 81 feet, continuing in a porphyry formation, showing fine lines of quartz and some clay.

UTAH.—The west crosscut No. 1 from the north drift, 1340 level, from the west crosscut from the shaft station, has been extended 61 feet; total length, 110 feet, continuing in porphyry and clay formation showing some quartz.

SIERRA NEVADA.—West crosscut No. 1 from the north drift from the Kenosha tunnel, 1000 feet in, has been advanced 34 feet; total distance, 137 feet; face in porphyry.

ANDES.—On 420 level, west crosscut No. 2 from north drift on east side of the ledge advanced 15 feet and work stopped in it. Upraise started in north drift between west crosscuts Nos. 1 and 2, was carried up 12 feet and stopped. Will to-day resume work in face of north drift on east side of the ledge.

BEST & BELCHER.—900 level.—East crosscut No. 1 has been advanced 23 feet in quartz giving low assays.

GOULD & CUREY.—400 level.—At a point in west crosscut No. 1, 140 feet from the main south drift, started an incline upraise No. 1 on a bunch of quartz showing some value; carried same up a distance of 20 feet. On the Suto tunnel level the joint upraise with the Savage Company has been carried up a distance of 15 feet; total height, 95 feet; face in porphyry.

HALE AND NORCROSS.—On the 800 level have started a west crosscut opposite the new east crosscut and advanced the same 10 feet; face in quartz and porphyry; also making some repairs to main north drift on this level. 900 level.—Repairing main drift, and extracted from stopes above this level 31 cars of ore. These stopes are not looking well. 1000 level.—Advanced south drift 10 feet; total length from the winze, 65 feet; face shows some low-grade ore. No. 1 west crosscut was advanced 10 feet and stopped; total length, 40 feet; face in porphyry. At a point 60 feet south from bottom of winze, started No. 2 west crosscut and advanced same 15 feet; face in porphyry. 1100 level.—From

north and south stopes above this level extracted 110 cars of ore. The stopes do not look so well as at last report. 1300 level—Have finished the new working station at head of incline and making necessary repairs to main incline at this point for a distance of about 50 feet. From winze below this level extracted 61 cars of ore. Main incline—Have repaired and cleaned out the two compartments of the main incline during the week a distance of 40 feet below the 1700 level. Stopped the extraction of ore from the mine on the 15th inst., but will continue regular shipments to the mill until the ore remaining in the ore house has been shipped. During the week have hoisted 202 cars of ore. Shipped to Brunswick mill 368 1500-2000 tons. Average assay of railroad car samples of ore shipped to Brunswick mill during the week, \$18.14. Average battery assay for the week, \$15.70. Shipped from Brunswick mill to U. S. Mint, Carson, yesterday, 314 pounds of crude bullion; assay value yet unknown.

POTOSI.—The south drift, 250 level, is repaired 55 feet south of Werrin shaft. Raisa above south drift, Potosi winze, 1150 level, is up 14 feet; top in fair-grade quartz. North winze 60 feet north of Potosi winze, 1200 level, is down 14 feet. There is 4 feet of fair ore in the bottom. Arc drifting north from bottom of south winze, 40 feet south of Potosi winze, in quartz assaying from \$15 to \$20. Extracted and sent to the mill in the past week 427 100-2000 tons of ore from the 930, 1000, 1140, 1150 and 1200 levels. Milled during the week 428 tons. On hand at mill, 80 400-2000 tons; average battery assay, \$25.84. Average car sample assays, \$26.43.

BULLION.—The joint Potosi winze is down 383 feet below the 1500 level; bottom in low-grade quartz.

ALPHA.—The joint Exchequer and Alpha south drift from north line of Exchequer, 1800 level, has a total length of 160 feet, face in clay and porphyry.

EXCHEQUER.—The joint Exchequer and Alpha south drift from north line of the Exchequer, 1800 level of the Ward shaft, has a total length of 160 feet, in clay and porphyry.

OCCIDENTAL.—Have extracted and sent to the mill 175 tons of ore of the average assay value of \$23.85 per ton as per battery samples. The Zedig drift from the Suto tunnel is in a total distance of 738 feet.

CON. NEW YORK.—The winze in No. 4 west crosscut, 650 level, is down 12 feet; bottom is in fair-grade ore. The 800 level drift has been repaired to a depth 250 feet northwest of the shaft.

SILVER HILL.—The south drift from the Justice shaft, 490 level, is out 815 feet. At that point have started an upraise to connect with the 260 level.

Tuscarora District.

NAVJO.—*Times-Review*, June 18: Have started an intermediate drift north from No. 1 chute, 350-foot level; progress 11 feet.

BELLE ISLE.—West crosscut, 250 foot level, extended 11 feet; rock getting harder. South drift, same level, extended 11 feet. No. 1 upraise on the east, 350-foot level, extended eight feet.

NORTH BELLE ISLE.—West intermediate crosscut above the 400-foot level extended 16 feet and connected with north intermediate drift, which has been extended six feet. No. 2 winze, same level, extended nine feet. Have started a crosscut west from No. 1 north drift, same level. South intermediate drift above the south 500-foot level extended four feet.

NEVADA QUEEN.—Second level—South drift from No. 3 east crosscut extended 12 feet; small seams in the face of drift. North drift extended to the Commonwealth line, exposing a foot of good ore. Stopes on west vein show no material change. Stopes in the east vein, where the ore had been extracted, came together, caused by the pressure of water. The only damage was the delay, as we had to wait for the water to drain off, but are working all right now. Hoisted 546 cars second-class ore, which was sent to concentrator, average battery assay \$24.62 per ton, and 36 cars battery assay \$24.1 per ton. Third level—South intermediate drift from No. 3 air shaft has been connected, and started to open out stopes. The ore where we have started shows two feet good grade.

El Dorado Canyon District.

AT WORK.—*Pioche Record*, June 18: At El Dorado canyon, the Southwestern Mining Co. are working about 60 men, including about 23 Indians. The mines look well and much ore is in sight, the most of it being of a lower grade than that worked last year and which netted the company handsome profits. Development work is being pushed ahead, and while ore is taken out from the main bodies, prospecting is being done for more. The majority of all their ores comes from the Mocking Bird and Wall Street mines, and enough is always on hand to keep the mill steadily at work. Accidents have been very few, one, two weeks ago, and of which mention was made in last week's *Record*, being the first in some years. James McGregor, an old Piocher, but for the last ten years a resident of the canyon, has a fine piece of property in the Flagstaff mine. He has made many shipments to Kingman, Arizona, and all have netted him handsomely, being able during the hot summer months to take a three months out to Monterey. He now has ready for shipment eight tons of ore that will average about \$200 in gold and \$200 in silver—\$400 to the ton. He also has a fine copper mine, shipments of which have assayed 29 ounces silver, \$6 in gold and 13 percent copper. John Hens is working on a large body of ore that will average in width 30 feet, but which is very low grade. Morton & Trembath have a lease on the Techaticup mine, and have out about five tons of ore, an average sample of which went \$800 to the ton, the principal part being gold. Mike Connelly has worked the Powers mine, which he pur-

chased last year, steadily since he bought it. It is now looking splendid, and he is taking out some fine ore. El Dorado canyon has always been a high-grade gold camp, and, in fact, heretofore the only one in the county, but it now has its rival in Ferguson district.

BRITISH COLUMBIA.

GRUB-STAKING ON A LARGE SCALE.—*Nelson Miner*, June 20: One of the best equipped prospecting expeditions that ever left Spokane for the north was fitted out by Rudolph Gorbow and Leo Sutor of Spokane, in cooperation with an Eastern capitalist, and started for British Columbia about the beginning of this month. The expedition is in charge of a gentleman who has made the Northwest his home for many years and is familiar with every foot of ground for 100 miles north and south of the boundary line, who is, furthermore, a geologist and mineralogist of some repute, assisted by an experienced prospector, the discoverer of many ledges that since have become famous. At the present time the expedition is working its way up one of the tributaries of the Pend d'Oreille river, and, according to latest advices received, has been successful in discovering some rich placer grounds, the working of which, on a large scale, it is intended to take at once in hand, while the "discoverers" of the expedition are pushing ahead up into the lofty mountains in search of the golden ledges from which these placer grounds must of necessity have received their supply of nuggets. The enterprise is backed by energy and unlimited financial resources.

IDAHO.

GOLD ON CAMAS PRAIRIE.—*Wood River Times*, June 15: Sigle Morrill was in yesterday from Camas Prairie. He reports that the recent discoveries on Soldier mountain have given renewed hope of important mineral developments to the ranchers who have stayed there through good and bad times. No vein in place has yet been found, but several prospectors are digging up the mountain and tracing rich float, and there is no doubt that the vein will soon be discovered. The float found is rich in free gold, partly decomposed, and disintegrates readily in a mortar and pan, showing a broad ribbon of fine gold in every case. All the prospectors find this float, but Peck, Hill and King, who have several locations, find more than the others and have several tons of it piled up. A Chicagoan who visited them a couple of weeks ago offered to put up a mill for an interest in the property, and to have it in operation within 60 days. The offer was rejected without hesitation. Soldier mountain, where this ore is found, rises abruptly above the prairie to a height of over 900 feet. Mr. Morrill, who has mined and prospected all his life, says that these are the best gold prospects he ever saw.

NEW MILL.—*Silver City Avalanche*, June 18: Work on the grade is progressing rapidly, and the walls will soon be commenced. A force of men is now at work quarrying granite for the foundation. The lumber and timber for the mill is being delivered at the site as fast as possible, and the machinery is now at Nampa. Mr. Mackay, who is in charge, is a thorough millman, and everything runs along like clock-work.

BLAINE TUNNEL.—The tunnel is lengthened some five or six feet every 24 hours. A big flow of water still comes from the same, but the drain is now constructed to the fountain head—a mammoth spring—something over 1000 feet from the mouth of the tunnel. A force of men is grading on the hillside opposite for a new and more commodious boarding house. Several windows have been placed in the engine room, adding to the cheerfulness of the same.

RALPH POOL.—A force of men is actively engaged in grading for the new mill, which will be situated near the road, just below the Ruth mine. Development work is principally being done at present, and an air shaft is being sunk to connect the lower levels. The timber for the new mill is now being framed in the lumber yard of the Central Lumber Co. at Caldwell, under supervision of Joseph Hawkins of this place.

PLACER.—Two or three Chinamen are placer mining a small bar of gravel on the War Eagle road, but we "no can say" with what success.

MONTANA.

MARYSVILLE.—*Montana Mining Journal*, June 18: To those who have not kept pace with the march of events there seems to exist a remarkable activity in the mines about and above Marysville, 16 miles northwest of Helena, while to those who have kept advised of the work which has been in progress during the past year and a half the pleasing condition of affairs of to-day appears as but the natural result of the development of a mineral zone of wondrous richness. In point of development the parent mine, the Drumblumun, under the ownership of the Montana Co. (limited) has been opened to a depth of more than 1600 feet and no signs of the exhaustion of pay ore is visible and it gives promise of being a profitable enterprise for years to come. The old Belmont, long idle from causes not due to the ore, is being again worked. On the Empire the Longmaid Bros. have proved that there is profit in low grade milling ore, and these horn miners have acquired ownership of the famous Peuboscot and ere the snow of winter comes the stamps will again be dropping on pay ore. The recently developed Bell Boy now is outputting 50 tons of milling ore a day and has an output capacity of 100 tons. Bald Butte has proved a surprise to the owners and has brought welcome dividends, while as yet it is little more than a prospect. In every direction there is life, promise and realization, and the sun is just over the hills that will rise and

shine on a mining district of wonderful achievement second to but one in the State.

HELLOATE PLACERS.—Favorable reports have been received of the workings of the placer mines in Hellgate gulch, being operated by the owners, W. H. Mackeye and W. R. Barnes. The gulch is in Meagher county, across the Missouri river, and is the next gulch east of Maggie. A bed-rock flume over 800 feet in length reaches bed-rock at a point where there is 14 feet of pay gravel, 11 pans of which have returned two dollars in gold. The property comprises three miles of the gulch, the pay channel averaging 200 feet in width. There is now being utilized 250 inches of water, under a 60-foot head, a force which moves a large quantity of gravel daily. The owners are confident of a rich clean-up this season, a result which will add to the proof that placer mining in Montana is still an important industry.

MADISON COUNTY.—Quartz and placer mining in Madison county gives promise of a season of activity and profit beyond what has been experienced for years. Messrs Fuller & Co., says the *Madisonian*, the lessees of the Silver Bell mine, owned by Henry Elling, are taking out large quantities of \$100 ore. Last week they cut in to a chute of ore, 18 inches wide, that assays in silver and gold over \$1700 per ton, and the chute appears to be extensive. The Silver Bell, which has since its discovery been looked upon as one of the best prospects in the camp, now bids fair to develop into a regular bonanza. This last strike in the Bell has created an interest in the other leads in the vicinity of it, and parties have secured leases on some of them—notably, on the Atlanta, an extension of the Silver Bell—on which work will be begun next week. The outlook for the quartz interests in this vicinity is very bright, and is growing brighter every day.

NEW MEXICO.

HIGH-GRADE ORE.—*Silver City Enterprise*, June 18: The Steeple Rock Mining and Milling Co. made a shipment of high-grade ore this week. The mine is looking well, with streaks of immensely rich ore, some of the fancy samples assaying \$18,000 in gold and \$640 in silver per ton, and yet showing no native gold or silver. The ore is supposed to be a telluride. Kedzie, Classen and App have struck it big in their Hachita mine. A good offer has been made them for the property, but was refused. On Saturday last, the Flagler Company shipped \$5600 in fine bullion gold and silver in the following proportions: Silver at market value, \$1667; gold, 933. The silver was from 990 to 996 fine. This bullion was the product from tailings from the mills after amalgamation of the ore and first concentrates had been taken and shipped to smelters. The average value of the tailings, as worked by the Waring process, was about \$8 per ton, and was only an experiment run to demonstrate beyond possibility of a doubt the practical working of the new process. This has now been proven a success, and the works are now ready to contract for ores in large quantities. If miners will only work their mines now and bring in their ores, they will make a big saving over shipping to foreign reduction works.

ALHAMBRA.—The Hobson mine is in bonanza. The chute of native silver which was first discovered at the surface has been followed and developed at a depth of 175 feet. The dip of the ore chute carries it away from the shaft, and a drift has been started, and is run about 30 feet north, and is expected to cut the ore chute within a short distance. The drift from the 250-foot level has struck the rich ore chute from above, and another ore chute has been struck in the shaft at 255 feet. Samples of the latter strike now lying on the desk where this is written are more than 50 percent pure silver and worth more than \$10,000 per ton. It is hard to appropriately designate the material, whether to call it ore or bullion; it is too rich for any plan of reduction but smelting into bars of fine silver. The Alhambra is showing better with every foot of development. The north drift shows good ore in several places, and some rich ore is being found in the south drift. It takes but a small quantity of such high-grade ore to make a paying mine, and the indications in the Alhambra at present are that re-odies of considerable extent are close at hand; in fact, it looks as if the ore bodies just discovered were the apices of large ore chutes. The Welcome is being worked by John Dodd and Charles Campbell. There is a large body of ore in sight and being developed.

OREGON.

GALE.—*Jacksonville Times*, June 19: Cleaning up for the season has commenced at Ennis & Cameron's mines in Gale creek, Josephine county. A favorable result is expected. Prospectors are investigating into the grand possibilities of the ledges of Southern Oregon at present, and there can be no longer any doubt that there is a great future ahead in the line of quartz mining in Southern Oregon. H. K. Schultz of Roseburg arrived from Myrtle Creek Monday, well loaded with gold-dust from a partial cleanup of the "Blue Rock" mine of Fawcett, Schultz & Co., in Bear gulch. He exhibited a nugget weighing \$40, which is the lightest ever found in that section. Operations at Cinnabar will probably be suspended in a short time, only a small force being employed there now. The mines have been bonded for a round figure, and representatives of both the Siskiyou Q. M. Co. and the syndicate who intend to purchase them are expected on the ground at any time.

MYRTLE CREEK MINES.—*Eugene Register*, June 20: H. W. Holden has been in from the Myrtle creek mines this week. He reports that he has about three weeks' work yet to complete the digging of the ditch for which he has contracted, and will then be kept busy until some time in August putting in the flume work. Two

gients are now kept at work in the mines in the daytime and one at night, and a large amount of dirt is being washed out.

THE GRANITE DISTRICT.—*Bedrock Democrat*, June 20: The warm weather during the past week has melted the snow very rapidly and brought the water with a rush. All creek beds are filled to overflowing. Placer mines, of which there are quite a number, are in full operation. Some of the same are paying handsomely and with an excellent prospect of continuing work until quite late in the season. The amount of snow in the high ranges will furnish plenty of water until late. On the high ranges of mountains on the north slope the snow at present is seven feet in depth, but with a continuance of warm weather it will rapidly disappear. A few of the quartz mines which were in operation during the entire winter have temporarily suspended work for a short time on account of water running into the tunnels. In nearly every instance where any amount of work has been done, the ledges have proven to be of great value. There are several parties in the Granite district from Montana and Colorado, representing capitalists, who are there for the purpose of investing in mining property if they can find suitable mines. There are also parties who have come from other mining countries, who are prospecting for themselves, and have been fortunate in finding ledges which show high-grade ore.

OUR MINES.—A mining boom. At no time has the outlook been as flattering as the present. The new discoveries and mining transfers in our mining circles and the almost certain sales of other mines in the near future, will, without doubt, give Baker county a general mining and business boom. We are in a position to know that heavy sales are on the tapis. Few of our people realize that we are on the verge of the most prosperous era in Eastern Oregon, but before many days the truth of the claim will be recognized.

UTAH.

LITTLE BELL GROUP.—*Park Record*, June 18: Hugh Kilkenny has a block of valuable ground lying between the Lucky Bill, Daly and Anchor mines that gives great promise of developing into something big in the way of a producer with proper development. The group comprises a block of ground 4500 feet in length by about 1000 feet in width, and is mostly patented. The surface indications are most excellent and show that the ground contains two veins—the east extension of the Anchor and the southern extension of the Daly. Mr. Kilkenny has done considerable development work on the group, principally through a tunnel, which is now in about 400 feet and has cut the Anchor vein. Where cut, the vein shows up good and strong and carries ore that assays fairly well, though it is too near the surface to be shipping rock. The vein is a safe guarantee; that, with depth, a mine will be uncovered, and to a man who knows how to estimate the value of a mining claim, it is as good a showing for the investment of capital as one could desire.

GLENCOE.—The Glencoe mill is running one shift and turning out concentrates at a fair rate, though not to the satisfaction of Supt. Curtis nor in keeping with the guaranteed capacity of the mill. The new Wall rolls, recently placed, do not seem to be able to crush the ore fine enough nor in large enough quantities, and it seems impossible to make them come up to the specifications in the contract. The first car of concentrates was shipped this week over the Utah Central to the Conkling sampler in Salt Lake, where it will be sampled and sold on the open market and the value of the Glencoe ore thoroughly established. Several of the heavy stockholders in this mine were in the Park this week and made a thorough examination of the property. They were highly pleased at the prospects for a dividend-paying mine.

ORE AND BULLION.—Monday last the Marsac mill shipped 9 bars bullion containing 10,645 fine ounces of silver. Since our last issue the Ontario mill has shipped 46 bars of bullion containing 24,974.63 fine ounces of silver. The Crescent shipped this week 507,000 pounds of concentrates and 25,000 pounds of first-class, making the total from the camp for the week 3,414,620 pounds, or over 1707 tons.

WASHINGTON.

SANDS STRIKES IT RICH.—*Okanogen Outlook*, June 20: Parties just in from the Palmer mountain country report a rich gold strike about 2000 feet east of the Reinhold claim, by the irrepressible C. C. Sands. It is on a ledge which has been considered barren and worthless; prospectors have picked at it and pessed it by, as the croppings did not show mineral. About two months ago Mr. Sands located the claim, and last week started to do a little work on it. Nearly the first shot put into the ledge threw out quartz carrying free gold in large quantities. Our informant saw some of the ore at Loomiston, and pronounced it as rich as any he has seen in the country. The pay streak is 16 inches wide, and heavily mineralized with free gold.

GOLN.—Chas. Gaupin is working on a promising gold ledge in Toats Coula, opposite the Douglas mine. He is taking out some very rich free gold, and will shortly have a mill test made of the ore. An \$8000 shipment of bullion from the Black Bear mill was made last week, as the result of a ten-day run. As the capacity of the mill is 12 tons per day, the above result would give the ore an average value of \$66 per ton. W. H. Abbott and T. D. Houston are developing the St. Lawrence, a strong eight-foot gold and silver-bearing ledge located 2½ miles south of Conconully. A 30-foot tunnel on the vein shows a well-defined pay chute of gray copper ore, and from the way it has improved in the last ten feet, the prospects are that it will soon develop into a good body of high-grade ore.

MECHANICAL PROGRESS.

Possibilities.

While the present century, or even the latter half of it, has been unusually prolific in new developments of science which have opened up new opportunities for supplying mankind with the necessities or luxuries of life at less cost of strength and time, it is possible that none of them are destined to accomplish more or prove a greater benefit to humanity than that which is being made to convert the natural forces of nature into an electrical power, by which their energy can be preserved, stored and transmitted by wire to far distant points, there to propel machinery, light streets and dwellings, and furnish heat or power for all purposes, from the baking of a cake to the melting of iron ore or the forging of an anchor.

If the vast power of the Falls of Niagara can thus be transmitted for hundreds of miles, the power of the little brook may be taken at least for shorter distances, and there would seem almost no limit to the power of man to confine, harness and drive at his will all the hitherto wasted powers that have rendered but partial tribute to mankind.

The running water and the passing breeze have long been utilized for certain purposes, and the forked lightning has been made an obedient and useful servant to those who have learned to bandle it.

But as the population of the earth becomes more numerous, and at the same time more exacting in their wants, there must be developed new sources of supplying those wants, or the old sources must be put to better uses, or used with greater economy.

Electric power now seems the most efficient power we know. But its one drawback has been the power of generating it, excepting under favorable conditions. If it can be generated from the waste powers of nature, or what have seemed such, not only the falling water and the wind, but from the fall of fruit from the trees, or the tread of men along the busy street (for who can say where our limit is to be when the work of progress is fairly begun?) when all this power can be saved, kept until needed, sent where it is called for and used for almost every purpose that is required, we shall have reached a point where the wildest imagination of man would not have reached a few years ago.

We may live to see the waters of Niagara lighting the streets of Boston and New York, and the coldest blizzard that sweeps the plains of Texas or Dakota heating the houses of Chicago, and the restless beat of the waves upon the seashore may propel the cars that climb the mountains of New Hampshire, and the freezing of our ponds may even warm our greenhouses if the energy of these powers can be first changed into electric power.—*Manufacturer's Gaze te.*

CABLE ENGINES.—The cable-driving engines for the power plant of the Broadway cable railway, New York, are being built by the Dickson Mfg. Co., of Scranton, Pa. At the Houston street station will be four simple, noncondensing engines, with cylinders 38x60 inches, and at the Fifty-first street station two similar engines, with cylinders 36x60 inches. The Corliss valve gear is used, and each engine has a 24 foot fly-wheel, built up of nine segments, and weighing 100,000 pounds. The frame of each engine is one large rectangular box casting, extending from the front cylinder head and including the main pillow block. The weight is about 34,500 pounds. The girders are formed to this frame, and have top and bottom slides of curved section, bored out from the end. The crosshead slides are curved to correspond. The crank pin is 11x11 inches, with a crank arm 11 inches thick on a main shaft 18 inches in diameter, the main bearings being 18x30 inches. The power of the engines, with an initial pressure of 150 pounds and a speed of 60 revolutions per minute, is rated at 1200 horse power for each of the larger and 1000 horse power for each of the smaller engines.—*Engineering News.*

SAND BLAST.—The peculiar fact is remarked upon in the *Engineering Journal* that, as compared with English practice, the sand blast process has found but little favor in the United States, a single company in Sheffield using at least 200-horse power of steam in its operations, and the application elsewhere in Europe being extensive for various purposes. In Sheffield the main utilization in this line is the recutting of new files to improve them. The process is familiar by which files are cut with chisels that raise up shavings or teeth, these being of curved

form and with a thin edge that soon crumbles or breaks, unless the cutting is skillfully done and the steel of good quality. When treated by the sand blast, the files are held at an angle, so that the sand impinges on the back of the teeth, cutting away the thin edge, but not affecting the face, the teeth thus becoming strong cutters without the thin curled edge left by the chisels in cutting. The operation is very rapid, requiring but a few seconds, and the value of the files is much increased. Sand, however, in the common sense, is not employed in this process, but a mixture of sandy clay and water thin enough to be circulated by pumps.

Overrating Steam Engines.

It is sometimes the case that steam engines are overrated by manufacturers, as to power, says the *American Mechanic*. This is partly due to the sharp competition in the steam engine trade and partly to a desire to get, or to appear to get, a good deal of power into small space. It is one thing to demonstrate that an engine can be made to develop a given horse power, and quite another to run that engine economically year in and year out developing that amount of power. A steam engine is, speaking from an engineering standpoint, of no greater power than it will economically work at continuously, or practically so, without requiring constant humoring.

But there is one redeeming feature in the overrating of engines. That is, the power required is in the majority of cases overestimated, or a large margin is left for possible future requirements, so that the power actually required is below that called for in the purchase, and the engine is better adapted to the work than if operated at its rated power. While this does not excuse the practice of selling engines under too high rating, it is sometimes a disguised blessing to the user, for it is a fact that is well known, that an underloaded engine—an engine too large for the work it has to perform—will show poor economy in spite of all attempts to remedy it by varying the steam pressure or speed, although something may be accomplished by the latter means.

Occasionally the overrating business works badly. Instances sometimes occur where the power required is underestimated rather than overestimated, and without any reference to economy it has been found impossible to get the engine to work at the power at which it was rated in the sale, which is bad for the builder.

SCIENTIFIC PROGRESS.

Fuel vs. Illuminating Gas.

At the recent annual meeting of the Western Gas Association, held at Detroit, Mr. K. Mitchell read a paper in which he gave a coal gas manufacturer's views of fuel gas. Mr. Mitchell said: In looking over the various processes of making fuel gas we see several methods of accomplishing the same end. It is pretty generally conceded among fuel gas men that a process which will allow of bituminous coal being charged into the top of the retort or generator, and pass down by gravity until the several processes of distillation are completed, leaving nothing but the clinker and ash to be removed at the grate below, is the most desirable. The value of the resultant gases for quantity and quality depends upon the quality of the coal introduced into the generator, as the heating agents are hydrogen, carbonic oxide, marsh gas, and a small per cent of olefiant gas. To produce a gas that is richest in heat units you must have a coal that produces a large quantity of good coke. In order to decompose the steam, incandescent carbon is necessary. The composition of gases from bituminous coals is given as follows: Hydrogen, 54.5; carbonic oxide, 36.4; carbonic acid, 1.6; marsh gas, 7.5. It is also absolutely necessary in vending a fuel gas, particularly a gas which contains over one-third of its volume of deadly poison, and which is to be used for domestic purpose, that it have a distinct and positive odor, an odor that will be lasting when mixed with air.

It will be seen by the above analysis that the only odor to the gas is from the small per cent of marsh gas. In our regular illuminating gas we get the well-known carbonaceous odor from over 42 per cent of its volume. The slightest leak upon a fixture or burner accidentally turned on, or burner in gas stove, which may be extinguished from boiling over of the contents of a kettle, is quickly detected and remedied. Not so with fuel water gas. If a burner is accidentally turned on and not lighted the presence of the deadly fluid is not detected by the victim. In order to remedy this great objection to fuel water gas, fuel gas makers

have introduced into the gas, while being generated, a few gallons of oil to each 1000 feet manufactured. Another plan is to allow the purified water gas to pass over crude Lima oil, which is periodically injected upon the water in the gas holder tank. The latter plan gives to the gas a perceptible odor at the point of escape, but the odor is not enduring and clears away or separates from the gas quickly.

The question to the consumer is not what is the theoretical value of the gas or air dilution to complete combustion of the gases, but how much monetary value can he get out of them; i. e., how many feet of gas will I consume a month doing my cooking or heating by gas when consumed in the best means at hand.

We have before us two cooking stoves, both of the best and latest patterns, made especially for the work for which they are intended. One is a stove fitted to burn coal gas, 16 candle power; the other is fitted to burn fuel gas with illuminating power, and of the composition as given in the before-mentioned table. We must gauge the stoves so that, when in use, the work can be done as expeditiously with one kind of gas as with the other. With the coal gas cooking stove we beat the oven in 15½ minutes from a temperature of 76°, ready for baking, consuming 6½ feet of gas. We place in the oven a six-pound pan of bread, regulating the gas to properly bake the bread. When baking is done, we note the time from the lighting of the burners to the completion of the operation. Total number of feet of gas burned, 17.5; pressure of gas, 14.10; total time, 1 hour 33 minutes.

With a fuel water gas stove of the same dimensions, we heat the oven in 17 minutes from a temperature of 76°, ready for baking, consuming 20 feet of gas. We place in the oven a 6½ pound pan of bread, regulating the gas to properly bake the bread. When cooking is done, we note the time from the lighting of the burners to the completion of the operation. Total number of feet of gas consumed, 64; pressure of gas, 32.10; time, 1 hour 28 minutes.

In boiling water upon the coal gas stove, we place over one of the top burners a vessel containing two quarts of water, temperature 48°. We bring the water to a boiling point in ten minutes' time, consuming 2.8 feet of gas. In boiling water over a fuel water gas stove, we place over one of the top burners of the stove a vessel containing two quarts of water, temperature 48°. We bring the water to a boiling point in 11 minutes' time, consuming 5.5 cubic feet of gas. We light all the burners of the coal gas stove; gas consumed, 60 feet per hour; pressure, 16.10. All the burners of a fuel water gas stove lighted consume 160 feet of gas per hour; pressure, 32.10.

In summing the matter up, the writer cannot see where there is anything done by fuel water gas that cannot be done by the illuminating gas now at hand. In cooking or heating stoves, one foot of illuminating gas will do more general work than two feet of the fuel water gas. It takes less capacity of mains, meter, etc. For example, to convey a certain amount of fuel water gas, a ten-inch main is required. To convey the same equivalent in heat units of illuminating gas, a main of seven-inch diameter will do the work.

Color in Plant Life.

Those familiar with the growth of flowers know how essential light is to the creation of color. The most gaudy blooms and the most brilliant foliage, if kept in the dark or overshaded, will become pale and almost white. This fact (according to the *Horticultural Times*) shows the presence in the plant of some chemical agent which is acted upon by the actinic rays. To some extent, this chemistry of nature is understood by florists, who, by the use of chemical manures and other means, strive to take the greatest advantage of it. For instance, it is a common practice to mix alum and iron filings with the soil in which certain plants are grown, in order to bring out special colors. The bluish-tinted hydrangea is the result of such treatment. Salts of iron, or sodium phosphate, added to the soil, turns the crimson of the peony to violet and produces blue bortensias. According to Dr. Hansen, who has studied the subject very closely for many years, there are only three distinct pigments to be found in flowers—setting aside the chlorophyll, which forms the green coloring matter in all plants. These colors are yellows, reds and blues. The yellows are mostly in combination with the plasmic sap, while the others exist chiefly in solution in the cell sap. The yellow pigment forms an insoluble compound with fatty matters, and is termed lipochrome. Orange is formed by a denser deposit of the yellow, and the color in the rind of an orange is identical

with that found in many flowers. The red in flowers is a single pigment soluble in water and decolorized by alcohol, but capable of being restored by the addition of acids. Lipochrome combined with this red pigment produces the scarlets and reds of poppies and of the hips of hawthorns, but the varying intensity of reds in roses, carnations, peonies and other flowers depends on the presence of a greater or less quantity of acids. The blue and violet colors are also decolorized by alcohol, but reddened by acids. Florists have already succeeded in producing a very large scale of unusual colors in flowers, and there seems to be very good grounds for believing that it is possible so to manipulate nature that she will produce blossoms of every conceivable tint and hue.

Behavior of Aluminum Toward Mercury.

Helbig makes the following communication on this subject to the *Pharm. Centralhalle*:

If a little mercuric chloride (or other mercuric salt) is placed upon a piece of metallic aluminum, white, hairlike formations will at once be seen to rise from the surface. These grow during a short time considerably (several centimeters during about 15 minutes). They are generally so fine that they can be blown away. To succeed with this experiment, the aluminum must be at least moderately clean.

The reaction may be employed for purposes of amusement. A very handsome result is obtained if the recently introduced aluminum penholders, having the form of bird's feathers, are coated with a strong solution of mercuric chloride. This will cause apparently additional feathers to grow out of the metallic one.

The reaction may also be used as an example of the inconsistency of the assumed law that bodies act upon each other only in a liquid condition, since the same phenomenon is observed no matter what liquid is used for dissolving the mercuric salt. On the other hand, when dry mercuric chloride is applied to metallic aluminum, the formation of "hairs" occurs even more rapidly than when solutions are employed.

The nature of the reaction is this: First, an aluminum amalgam is formed. Next, the aluminum dissolved by the mercury is oxidized by the air and converted into alumina; this is shown by the fact that when a piece of aluminum is put into a solution of mercuric chloride, metallic mercury is separated. On the other hand, the "hairy" feathers are not formed if the reaction is attempted with exclusion of air.

THERMOMETER FOR HIGH PRESSURES.

A reliable thermometer for high temperatures, as described in the *Philosophical Magazine*, has at last been devised, the instrument being made in the form of a platinum resistance, the simplest shape of which consists of fine wire welded to leads of comparatively low resistance; the electrical resistance of such a wire varies according to its temperature, so that the reading of the one gives the other by consulting a table prepared with reference to the zero of the instrument. Siemens' well-known electrical pyrometer depends upon the same principle, but in this case the zero is known to change largely and continuously—an effect due, it is alleged, to the imperfect design characterizing the Siemens apparatus; the fact being that, if the wire is pure to start with, and is protected while in use from strain and contamination, its resistance, after having once been annealed, is always very near the same at the same temperature. The improvements now announced in the platinum resistance thermometer, or pyrometer, consist in the better protection and treatment of the platinum wire, and this is differently treated according to the heats to which it is to be exposed; for temperatures below 700 degrees Cent., the leads may be of copper or silver and the tube of hard glass, or, for work below 1,000 degrees, a wrought iron tube may be used.

COTTONSEED HULLS.—Travelers in the South have frequently been impressed with the annual waste of several hundred thousand tons of cottonseed hulls, and it is satisfactory to know that steps are now being taken to utilize this waste. Improved appliances are likely to lead to the use of the refuse in the manufacture of certain classes of paper almost exclusively. The cottonseed hull is like the scale of a fish, and when it is treated becomes pure cellulose. It is absorbent to a wonderful degree, and will in all probability enter largely into the future manufacture of blotting paper.—*Mag-nolia Gazette.*

ELECTRICITY.

The Lesson of English Mining Development.

In the application of electricity in its three-fold manifestation of light, heat and, power to mining operations, America has taken such a decided lead that it is another case of "Eclipse first the rest nowhere;" but mainly through the efforts of a few determined and progressive English mining engineers, who have, with watchful and jealous eyes, noted the American development, the English miners are awakening to the immense advantages that are to be found in this agent of progress. The backwardness of England in this regard has been due, in a large measure, to the unreasoning and in many respects fanatical prejudice against the trolley wire. Englishmen have, like the rest of the world, been waiting for the perfecting of the storage battery, but, unlike the rest of the world, England has not been willing to make use of any other system while waiting for the ideal one. The result has been that England has been largely left behind, but there are signs that even there some progressive spirit is being aroused, and there are those who believe it a wise policy to take advantage of the existing methods while waiting for improved ones. Electric railroads operated by the trolley system, and electric motors and locomotives in mines, run by the same system, have been so overwhelmingly successful in this country, that even the most cautious and conservative Englishman now begins to see the necessity of doing something to gain some of that success in his own country.

Those pioneers in the art, who have spent time, labor and money in assisting this development, who have labored on through discouragement, disaster and prediction of failure, have their reward in seeing their ideas taken up by those who most loudly decried them in the beginning. Of electric power it once might be said, "Despise not the day of small things;" but that cannot be said now, for that day has passed, and it is a day now of large things, but though large as compared with the very recent past, yet small when the future is considered. The day is not far distant when every dwelling will be lighted and heated by electricity, when every industry will hear the hum of the electric motor, and coal and steam will be confined to the large electric generating plants, located in convenient centers of trade and population, whence the mysterious yet beneficent electric current will radiate in all directions, carrying with it unlimited possibilities for ministering to man's comfort, happiness, mental, moral, physical and pecuniary welfare.

But this development will not come by idly sitting down and waiting for it. It will be worked for, by utilizing the present resources, improving them and extending them, and taking quick advantage of every new scientific discovery. Our English brethren are learning their lesson as we in America have learned it, and the result is that in both countries the indications are that we are on the threshold of new and important discoveries in the field in which we are all laboring.—Electric Power.

CARVING STONE.—The Chicago *Journal of Commerce* says that the carving of stone can now be done in less than half the time formerly occupied, by the use of an electrical reciprocating tool. This can be regulated to strike a series of blows at any speed and with any degree of force, and thus the physical labor hitherto necessary is done away with. The instrument is also coming into use in the studios of sculptors, who are much hampered by the material restrictions involved in the working out of their ideas. The sculptor can now devote his entire attention to the lines the instrument is to follow, and the cutting of the marble is done far more rapidly and accurately than by muscular power.

CONDENSERS IN ALTERNATING CURRENT DISTRIBUTION.—Although the application of condensers in alternating current systems has not yet been made an accomplished fact in practice, yet the possibilities and advantages make this a subject of considerable interest at the present time, even though it may be quite a while before actual work is done in this direction. Swinburne, Stanley and others are working hard in this field, and it is not unlikely that they will arrive at some very useful results sooner or later. As the behavior of condensers in alternating current circuits is, perhaps, not well understood by many, we publish in another column a short but clear summary of the subject, which, without considering the whys and wherefores, shows the different ways in which condensers may be con-

nected, and how they will act when thus introduced into branch or main circuits. It will doubtless be difficult for many to understand the apparently curious fact that a condenser in circuit may raise the potential far above that used to charge it. It acts in this case similarly to a transformer, changing volts into amperes and amperes into volts, so to speak, or more correctly, changing the quality of the energy. As the condenser may in future play an important part in alternating current work, a clear understanding of the underlying principles will help one greatly in dealing with the problems which must come up.—Electrical World.

PREVENTION OF SPARKING IN DYNAMOS. An ingenious arrangement for preventing sparking between brushes and commutators has recently been devised by M. Deprez. The commutator is made in two parts, so placed that the conducting bars and insulating spaces, which are of equal width, alternate with one another in the two halves. The current is collected by two brushes on each side, joined by a resistance, from the center of which the main circuit is taken. A battery of accumulators added to this circuit has just sufficient E. M. F. to oppose that of the coil undergoing short circuit, and thus the inventor is said to have run high-pressure machines with absolutely no sparking.

A NEW METHOD for carrying electric wires for a trolley system in a mine has been devised. It consists of a post pointed at either end. The pole is cut at the middle, and by means of a threaded screw and handle, the two parts may be separated at will. To use this extensible stand, the conductor is first secured in the clamp at the end of a bracketed arm, and then the whole affair is so arranged that the points at the opposite ends are adjacent to the top and bottom of the mine. Revolving the handle, forces the pointed post in different directions, until the pole is in a firm position. The handle may be then set by means of a screw.

USEFUL INFORMATION.

A NEW OPTICAL APPLIANCE.—Every draughtsman knows the convenience of the sectional-ruled drawing papers when making rough sketches for new designs. The instrument we now describe is intended to give the same or greater advantages without the necessity of using expensive lined paper. It is simply a photographic lens mounted at the height of twice its focal distance above the sheet of plain drawing paper. At a similar height above the lens is a sheet of plain glass the same size as the drawing board. Sheets of transparent celluloid or other suitable material, having opaque patterns produced on them by photographic or other means and laid upon the surface of the glass can, of course, be illuminated by daylight or artificial light in such a way that an image of the patterns will be projected on the surface of the drawing paper. There is, of course, no reason why the patterns and the projected image should not be of unequal size, if desired. But the arrangement described is said to be preferable. A base line for the sketch or drawing is given by the T square, and a couple of ruled plates—one having diagonal and the other concentric circular lines—do the rest.—Optician.

POLISHED WOOD.—For various ornamental purposes, wood with a mirror polish is now being satisfactorily employed in Germany as a substitute for metal. In carrying out this plan, the wood is suitably prepared by being first submitted to a bath of caustic alkali for two or three days at a temperature of about 175° F., then dipped into hydro-sulphate of calcium for about 24 to 39 hours, after which a concentrated solution of sulphur is added. After being subjected to another dip in an acetate of lead solution at about 100°, a shining metallic surface is imparted by polishing when dry with lead, tin or zinc.

THE COCOANUT TREE abounds in South Florida. It is not a native, nor has the fruit been cultivated for any great length of time. The introduction is attributed to the wrecking of a Bahama vessel. Some of the cocoanuts forming its cargo were planted and made trees, which have thriven wonderfully. In Dade county, one of the southernmost counties of the State, which has a sea front of 150 miles, there are now groves of great beauty containing from 100 to 6000 trees.

A METHOD of utilizing the waste heat of slag has been patented by Messrs. Howell and Ashcroft of the Proprietary mine, Broken hill, Australia. The idea is to run the

molten slag into iron chambers capable of withstanding pressure, and to raise steam by spraying the red-hot slag with water. If the method succeeds in practice, it is said that the Proprietary mine would save £30,000 per annum in fuel.

GOOD HEALTH.

Abnormal Breathing.

Neither man nor animal breathes through the mouth normally, says the *Manufacturers Gazette*. The only natural way for respiration and inspiration is through the nose. When we breathe through the nose, the cold, dry, impure outward air is sufficiently warmed, supplied with watery vapor and freed from dust. When we breathe through the nose, smelling at the same time through our organ of smell, which assists respiration, we become aware of the presence of an injurious or of a generally abnormal mixture drawn in by the breath, and can then either correct so unfavorable an atmosphere or escape from it. Furthermore, only in the nose are found those fine arrangements which can prevent the entrance of injurious substances into the deeper respiratory organs (larynx and lungs) and thus stop the further advance of the hostile body (painful smoke, irritating dampness, thick dust, etc.), besides defying that which has already slyly effected an entrance. This is done by the so-called nasal reflex breathing, to which class belongs sneezing.

If we breathe through the mouth the air is neither sufficiently warmed nor satisfactorily moistened, and laden with all its bad mixtures of dust of mineral, animal and vegetable origin, added to injurious gases, reaches the larynx, the air tubes and the lungs. Snoring is only the least among the evil consequences of breathing through the mouth. The swollen, sore, constantly chapped lips, had condition of the front teeth and decay of the back ones, a defective development of the sense of smell, frequent inflammation of the throat, attacks of fever, diphtheria and catarrh, and soreness of the larynx and lungs are consequences of breathing through the mouth which have been frequently observed. In children one often sees an habitual and peculiar weak or even stupid expression of countenance. It has also been found, through the experiments of different trustworthy observers, that there is a casual connection between stammering and breathing through the mouth. On the other hand, however, certain forms of nightmare and asthma are causes of breathing through the mouth. That infants are sometimes brought almost to death's door when prevented by a cold from breathing through the nose is a fact well known to physicians.

When a child or grown person begins to breathe with the mouth open there must exist some sufficient cause for the occurrence in the uppermost air passages. No one would voluntarily exchange the only healthy, comfortable manner of breathing through the nose for the burdensome and unhealthy breathing through the mouth. Let any one attempt to breathe through the mouth for five minutes, instead of, as one is accustomed, through the nose, and he will soon be convinced that it is almost impossible. Almost of itself, that is, without muscular force, through the mere pressure of the air, the mouth closes, and the original manner of breathing is resumed.

Whoever snores can, as a rule, not breathe through the nose. That it would be useless in such cases to desire to close the mouth mechanically is entirely comprehensible. Every mother, who frequently gives to her child the useless command "close your mouth," is aware of this. Here it is better to seek, without delay, the advice of an experienced specialist, in order to determine the cause of this mouth-breathing. In the case of children, in particular, an unnecessary delay may prove fatal.

Now there are certainly cases in which the cause of this habit may be determined and the habit still remain. But these are the exceptions; as a rule normal breathing results as soon as the air enters the correct passages; if the snoring and breathing through the mouth returns as an evil habit, then and only then can mechanical means be used with advantage to stop this opening of the mouth.

The simplest and oldest of these is to place a hand from the chin to the top of the head. This often suffices. As the mouth remains closed by pressure of the air, some of the mechanical appliances to produce this effect might be used. Sometimes it is even sufficient to place a piece of celluloid plate between the teeth, but one would not likely decide to place a foreign substance in the mouth of a sleeper, particularly a restless child.

Mexican Mining Law.

An Outline of its Principal Points.

The following are some of the leading points in the new mining law of Mexico. It has been radically changed from the old law, and those intending to go into Mexico to mine had better post themselves.

The mineral substances for whose exploitation a concessions is in each case necessary are:

Gold, platinum, silver, quicksilver, iron, except that in water or in ochres that are worked in the same manner as coloring materials; lead, copper, tin, antimony, nickel, cobalt, manganese, bismuth, arsenic, precious stones, rock salt and sulphur.

The owner of the surface can work freely, without the necessity of a special concession in any case, the following mineral substances, combustible minerals, mineral oils and waters, the rocks in general of commercial value for building and ornamental uses; valuable clays and earths and sand of all classes; mineral substances except those noted above.

Mining property acquired according to the specifications of this law will be irrevocably and perpetually, upon payment of the federal fees, the property of the exploiter.

Waters proceeding from the subterranean works of mines are the property of the owners of said mines, who must observe the specifications of the common laws in directing the course of these waters.

The works required for the exploitation of the mines and placers are of public utility; and if there is lack of agreement there can be a forcible condemnation of the lands necessary for this purpose.

All inhabitants of the Republic have the free right to explore the public lands for minerals, but no excavation shall exceed ten meters in width, length or depth. For this much space no license will be required, but it is obligatory to notify the proper authorities.

In lands owned by private parties it is not lawful to prospect for mines without permission of the owner, or representative, but in case this permission is not obtained the prosecutor can apply to the proper authorities, who will estimate the damage caused by the explorer in the presence of the owner of the lands, or his representatives, and require a bond to be given by the prosecutor.

Within private building and ground belonging thereto, prospecting can only be made with permission of the owner. It will not be lawful to explore for minerals within the limits of any city or town, nor within public edifices or works, nor within fortifications and adjacent grounds.

In all such cases the regulations fix the minimum distance to which these explorations can be carried.

A mining claim or "pertenencia" shall be a square of 100 metres on each side and of indefinite depth.

The mining claims will always be given to the first persons soliciting them, and will embrace in every case the number of "pertenencias" (whenever there is sufficient free territory) that may be asked for by the interested party who should specify in the clearest terms, and in accordance with the laws, the location of the "pertenencias" embraced in the claim.

The concessionaries having obtained title to property, possession can be taken at once and without other formality.

The societies or companies formed for the exploitation of mines shall be formed according to the commercial code and civil code of the federal district, except that part which is not admissible on mining subjects.

The contract, which has heretofore been known as "Avio," will, in the future, take the form of a stock company, or of a mortgage.

The new tax imposed in all mining concessions, excepting those expressly exempt by contract, will be a federal property tax and will be established by special law.

In respect to taxes on mines the specifications of the law of June 6, 1887, will be observed.

The contracts for the exploration and exploitation of mining zones concluded with the Department of Public Works, Colonization and Industry which may be still in force when this law takes effect, will remain in vogue for the whole of the stipulated term if the concessionaries so desire; however, these concessionaries may, upon the promulgation of this law, accept its provisions within the term of one year by making the necessary declaration to the department, and they will be relieved from the obligations imposed by their contracts.

This law will go into force the 1st day of July, 1892, from which date the Mining Code of Nov. 22, 1884, and all the circulars and rulings relative thereto, become abolished,



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W. B. EWER.....SENIOR EDITOR

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SAN FRANCISCO:

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BUSINESS ANNOUNCEMENTS.

[NEW THIS ISSUE.]

Steel Whim—Risdon Iron Works.
 Assessment Notice—Gould and Curry Silver Mining Co.
 Dividend Notice—The German Savings and Loan Society.
 Engineering—Horace B. Gale, Menlo Park.
 ☞ See Advertising Columns.

EMMONS, the eldest son of Mr. Blaine, died at Chicago on last Saturday. He had been sick but a day, and only for a few minutes before his death was his condition known to be serious. It was a sudden and awful stroke, the more sad as it followed within a year the death of a sister and a brother. The young man was a conspicuous figure at the Minneapolis convention, and took seriously to heart the failure of that occasion, and it is believed that his death resulted from nervous reaction. He was an attractive and lovable man, aged 35, a husband of three years and very recently a father. In a career apart from the political life of his family he was notably successful, and he was the pride and hope of his father, now in many ways sadly bereft. The heart of the country has gone out to his family in a grief for which there is no balm. In the first session of the National Democratic Convention, on Tuesday—a convention met to combat the political principles of the great Republican leader, and in which there was no political friend of his—somebody moved a vote of sympathy with Mr. Blaine. Every man in the hall arose in approval. The chairman declared the resolution unanimously carried. Tears came as men grasped hands, and the great building rocked with the thunder of their cheers. Truly, the old passions of politics are passing away—thank God for it!

A Lost Fight.

There is small comfort in the political situation for the advocates of free silver coinage. Both Harrison and Cleveland are committed positively against it, and the platforms upon which they stand are framed in correspondence with their views. In each of the silver planks there is an artful attempt at double meaning, but when taken in connection with the nominations, they stand alike for the gold standard. The Republican plank is as follows:

The American people, from tradition and interest, favor bimetallism, and the Republican party demands the use of both gold and silver as standard money, with such restrictions and under such provisions, to be determined by legislation, as will secure the maintenance of the parity of values of the two metals, so that the purchasing and debt-paying power of a dollar, whether silver, gold or paper, shall be at all times equal. The interests of the producers of the country, its farmers and workmen, demand that every dollar—paper or coin—issued by the Government shall be as good as any other. We commend the wise and patriotic steps already taken by our Government to secure an international conference, to adopt such measures as will insure a parity of value between gold and silver for use as money throughout the world.

The Democratic platform shows how the same thing can be said in a different way, as follows:

We denounce the Republican legislation known as the Sherman Act of 1890 as a cowardly makeshift, fraught with possibilities of danger in the future, which should make all its supporters, as well as its author, anxious for a speedy retreat. We hold to the use of both gold and silver as the standard money of the country and to the coinage of both gold and silver, without discriminating against either metal or charge for mintage, but the dollar of the unit coinage of both metals must be of equal intrinsic and exchangeable value, either adjusted through international agreement or by such safeguards of legislation as shall insure the maintenance of parity between the two metals and the equal power of every dollar, at all times, in the markets, and in the payment of debts; and we demand that the paper currency be kept at par with and redeemable in such coin. We insist upon this policy as especially necessary for the protection of the farmers and laboring classes, the first and most defenseless victims of an unstable money and fluctuating currency. We recommend that the prohibitory ten per cent tax on State bank issues be repealed.

There is a truce between the two great parties as to silver, and there seems no prospect that it will be broken during the next five years. Nothing is more certain than, if Congress were to enact a free coinage measure, that it would be vetoed in the White House. For the present, the fight is lost, and, however unpleasant the fact may be for silver advocates, no good can come of attempts to deny or evade it. Of all forms of deception, self-deception is the worst. It is the voluntary assumption of blindness.

The discussion of the coinage question during the past six months has been to the disadvantage of silver. The gold standardists have succeeded, not, indeed, in convincing the country, but in alarming it. They have brought to bear against silver the influence of the doctrinaires, the bankers, the capitalists, the chief political leaders, and the vast hosts of the timid. Against the force of these united elements it has been impossible to make headway—hence the result. It has been the misfortune of the silver cause to have no advocates save those who directly represent the money interests involved or the political interests connected with them. The college professors, the financial experts, the capitalists (save only the silver capitalists of Colorado and Montana), have all been on the other side. The silver cause will not be given up, for the abiding conviction of its justice remains with its advocates, but they must have the courage to look squarely in the face five years more of waiting.

THE COCOPAH COUNTRY.—John Albright, a well-known mining man, who has just returned from the Cocopah country, in Lower California, reports the discovery of a new mineral district, including one large vein mining \$150 in gold to the ton, with traces of silver. A further investigation of the region revealed rich deposits of alum and sulphur, with at least five parallel lodes of gold-bearing quartz. Placer gold is also found. A party is being organized in San Diego to prospect the region. According to the description of the finds, they are not far from the garnet mines lately discovered by Brown and Crawford.

The powder companies are having dull times and there is again talk of a pool.

Is This Reform?

Amidst the congratulations of friends and to the delight of the "street," James L. Flood, at the last annual election of the Hale & Norcross Mining Co., took control of that company. The gentlemen who were elected directors were known to be his friends, and every one congratulated themselves that this magnificent property would now be put on at least a self-supporting basis.

Its stockholders had been scandalously robbed by the outgoing Board of Directors, who were publicly proven either to have, by their passiveness, consented to the defrauding of the owners of the mine, or to have accepted a share of the loot.

Prominent rich men and officials had been publicly branded as robbers, and it was supposed that the lesson taught these people would not be lost on the new management. What do we find?

That this new management sent the ore extracted from the mine since their assumption of power to the Brunswick mill, where it was found impossible to make \$20-free-milling ore pay but little more than milling charges. As a culmination of the reform management, they have adopted the following resolutions:

Meeting June 13, 1892. Present, Directors Messer, Wells, Fish, Lyle, Hart, Gurnett and Edwards, being a full board.

On motion of W. S. Lyle, seconded by Mr. Geo. R. Wells, it was unanimously "Resolved, That this company file a supplemental answer in the case of M. W. Fox vs. The Hale and Norcross S. M. Co. et al. (No 30,508 in the Superior Court of the City and County of San Francisco, Department 4), and that Mr. W. H. H. Hart be appointed as attorney for this company to file such answer and to take such steps as he may deem proper to fully protect the rights of this company under said judgment, and said W. H. H. Hart to be substituted as attorney for this company in the name and stead of the attorneys who have heretofore filed answers for this company" (Hart not voting. Unanimously carried).

June 16th, 1892.—Continuation of adjourned meeting of June 13th.

Present: Directors Messer, Wells, Lyle, Fish, Edwards, Gurnett and Hart.

The following resolution was offered by Mr. Gurnett:

Resolved, That Mr. Wells (of the Board of Trustees) be authorized to attend to the suit of M. W. Fox vs. The Hale and Norcross S. M. Co. et al. in place of Mr. Hart (also of the Board of Trustees) without any further compensation than his present salary.

This resolution was seconded by Mr. Edwards.

The following amendment was then offered by Mr. Fish:

Resolved, That this corporation employ Mr. W. H. H. Hart as attorney for this company at the following compensation: First—\$2000 cash down, \$1000 when the case is in the Supreme Court for argument, and \$2000 cash when the case is finally ended. Second—A balance of \$5000 contingent that defendants in the case pay judgment into the treasury of the company of not less than \$200,000.

The vote on this amendment was, ayes 4, (Hart not voting) noes, Gurnett and Edwards.

The original motion as amended was now voted on, ayes 4, (Hart not voting) noes, Gurnett and Edwards.

Can anyone imagine anything more infamous and iniquitous than this?

If there was a need for any service by Mr. Hart, if he could help the cause or gain anything for the stockholders it would be different; but the matter is in safe hands and needed no interposition by anyone. Mr. Wells is amply qualified to do all that was necessary, and the \$10,000 is but another subscription to the cause of corruption.

It is not enough that the unfortunate shareholders in this company have been shamefully defrauded by the last Board to

whom they entrusted their interests, but the new Board of directors flaunting the "Banner of Reform" under their very noses, start in on useless expenditure like this with a shamelessness which is only equalled by that of the unjailed criminal who was branded "thief" by the courts of justice. These people now commit an act which is scarcely surpassed by the reckless gang just found guilty of pilfering.

It is a painful coincidence that the people supposed to represent Mr. Flood in the present Hale & Norcross Board of Directors are Messer, Fish, Lyle and Wells—just four—and this donation of \$10,000 out of the treasury of the company was given by just four votes.

Let it be said to the credit of Messrs. Gurnett and Edwards that their votes were recorded against this iniquity.

Let this resolution be immediately rescinded, and let Mr. Hart, as a Director of the Hale & Norcross Company, entrusted with interests to protect, return at once to the company any sum or sums of money he may have received therefrom as a part of this \$10,000.

The stockholders will stand but little more of this. They appealed to the law to right their wrongs, as law-abiding citizens should do. They defeated the rascals who were stealing from them. They looked forward to relief from the wrongs, but apparently have not bettered themselves. It would look as if the Honorable Judge should have put the Hale & Norcross Company in the hands of the receiver instead of the judgment only, and then the shareholders would have been saved such outrages as this \$10,000 donation.

The Candidates.

The National Democratic Convention which is still in session as we go to press (on Thursday) has nominated Mr. Cleveland for the presidency and A. E. Stevenson for the vice-presidency. Within the coming fortnight the People's party and the Prohibitionists will name candidates, but they will make small figure in the campaign. The real fight, as the whole world knows, is between the Republicans and the Democrats—between Mr. Harrison and Mr. Cleveland.

There have been features of singular correspondence in the convention contests of the two parties. Both at Minneapolis and at Chicago there was a casting out of devils the like of which has not been seen before in the recent career of American politics. The Republicans dethroned the usurping leaders—Quay, Platt, Clarkson & Co.—and the Democrats tamed the Tammany tiger and gave Gorman, Brice et al. back seats. The contest in each convention was between the party and the bosses. It was the people against the politicians, and the people won.

If ever there was a time when the election of a Republican, as such, or of a Democrat, as such, would have menaced the integrity of the government, that time is now past. Those who read rightly the signs of the times and whose interest in politics rests solely upon regard for the welfare of the country, know that it is not Democratic or Republican success that is to be dreaded, but the success of bad Democrats or bad Republicans. The election of a Democrat under the spell and subject to the influence of the New York Tammany Society, and of such spoilers as Gorman of Maryland, Brice of Ohio, and it is with regret that we must include that brilliant man, Waterson of Kentucky, would, indeed, be a national misfortune; but no more a misfortune than would be the election of a Republican directed by such "practical" politicians as Platt of New York, Clarkson of Iowa, Quay of Pennsylvania and De Young of California. It is, indeed, a satisfactory and wholesome situation when each party can write a clean and honest name upon its banner, put its worst element to the rear, and go into battle upon questions of governmental policy concerning which honest and patriotic men may fairly differ.

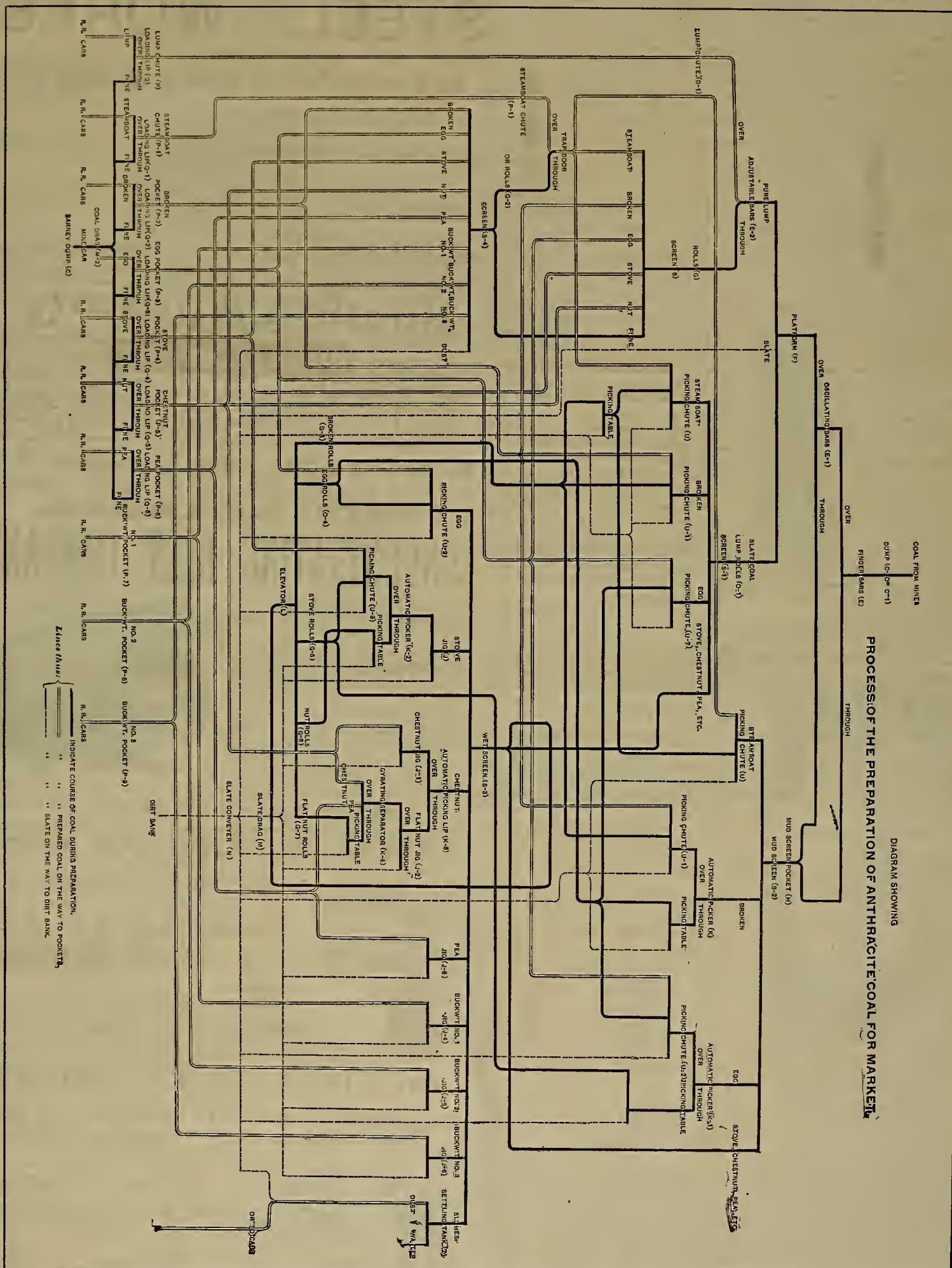
Preparing Coal for the Market.

Anthracite coal as it comes from the mines is not marketable. The "run of

as possible, so that between them a large amount of surface will remain exposed to the action of the air without checking the draught too much, or allowing enough air

therefore, that one of the most important points in preparation is to have a uniform sizing, and also to make as large a number of different sizes as can be produced with-

generally occur. The term "slate coal" designates lumps composed partly of coal and partly of slate, in which the pure coal occurs in such large masses that, by re-



mine" cannot, as in the case of bituminous coal, be sold. Anthracite, being very compact and practically free from volatile combustible matter, burns only at the surface, and it is, therefore, deemed important to have the lumps as nearly of a uniform size

to pass to cool the coal below the ignition point. In other words, if the pieces of coal of the size of a chestnut and smaller are mixed with lumps of the size of an egg, they fill the air passages and prevent a free draught. It has long been recognized,

out too great expense. It is also essential to remove all the dust, which is of little or no use at present, and depreciates the value of coal in the market.

Mixed with the pure coal, large amounts of slate, "slate coal" and "bony coal"

breaking, pieces of pure coal of marketable sizes can be obtained economically; and "bony coal" designates lumps in which the coal and slate are so interstratified that they cannot be separated economically by mechanical preparation, also coal in which the

impurities are present in such high percentages as to destroy or greatly diminish its market value. In other words, slate coal is coal from which, by breaking and preparation, a certain amount of pure coal can be obtained. Bony coal is coal which cannot be economically rendered more pure by mechanical preparation, although it may be used for certain purposes in its crude condition.

The problem is, to remove the impurities as completely as possible. Of course, when the slate occurs in separate pieces, it should be eliminated without further breaking. But the slate-coal must be broken into smaller pieces to separate the slaty portion from the coal. It is generally impossible to sell all the larger lumps which come from the mines, and machinery must be provided for breaking them up into such sizes as the market requires.

The coal coming from the mines should be divided into its various sizes, and the free slate in each size should be removed, before any breaking is done. This can be done either by hand labor or by mechanical means. In the first case the coal is passed along chutes, on the sides of which men and boys are placed, who pick out the slate, and in some cases the bony and slate-coal, and allow the pure coal to pass into the pockets. The mechanical elating of the coal depends upon one or more of three physical characteristics of the coal and slate: The difference in their specific gravity; the difference of the forms in which they break, and the difference of their angle of friction, or, in other words, the difference in the angle of a chute, lined with stone or iron, down which the coal or slate will slide without any increase of velocity. As a rule, slate will not slide down a chute which will carry coal.

In different numbers of the PRESS within the past few months the machines for sorting the coal have been described, these descriptions having been taken from a paper read before the American Institute of Mining Engineers by Eckley B. Coxe of Drifton, Pa., on "The Iron Breaker at Drifton, with a description of the machinery used for handling and preparing coal at the Oross Creek collieries." On this page is a diagram of the preparation, showing the progress of the coal through the breaker from the mine to the cars.

Geological Researches.

To Baron Ferdinand von Richthofen the London Geological Society has awarded this year the Wollaston medal, in recognition of the great merit of the researches carried on by him over a large part of the Old World and of the New.

Among the contributions made by him to the geology of the United States, is that of the Comstock lode and his remarkable generalizations as to the order of succession of the volcanic rocks and the nature of "massive eruptions" have attracted special attention.

The Baron spent somewhere about three years in a series of journeys through the vast Celestial Empire. The massive volumes and splendid atlas which contains his account of China, form one of the most important contributions ever made to geological literature.

The monograph on "Volcanic Rocks" written by Baron von Richthofen, was published by the California Academy of Sciences, the paper having originally been read before that society.

At the annual meeting of the Homestake Mining Co., the following directors were elected: Irwin O. Stump, J. B. Haggin, Lloyd Tevis, Louis T. Haggin and George J. Henry. Louis T. Haggin was elected president, J. B. Haggin treasurer and Irwin O. Stump secretary.

THE Omega mine and smelter, in the Arispe district, Sonora, has been sold by the Prefect of Police.

Professional Mine Directors.

The recent Hale & Norcross decision legally puts the directors of mining companies in the place they belong—simply agents of the stockholders. They have for years, however, when once in office, acted about as they pleased, without much reference to the wishes or interests of the stockholders, who are the real owners of the mines. This state of affairs has existed so long that many of those professional directors imagine certain of their "vested rights" have been interfered with by the decision of the courts. They are in a state of astonishment over having to refund money which they conspired unlawfully to take from the stockholders.

It is just such practices as were shown up in this case which have brought the mining stock business to the condition it now is, when the brokers can hardly pay office rent. The public long since had reason to become distrustful of the management of the companies. It was seen that there was very little chance for an "outsider" to make any money out of the legitimate mining operation. If he got nothing from increase in value of stock, there was no chance to get anything in any other way.

Gradually, people began to ignore mining stocks altogether and let the market severely alone. Finally the Mining Stock Association was formed and took steps to remedy some of the existing and well-known evils. A direct result of this determination was the successful suit against the Hale & Norcross directors for conspiring against the stockholders. The charges were proven, and the court decides that the directors shall refund \$1,000,000 unlawfully kept from the stockholders.

The findings in the decree have been signed by Judge Hebbard, and are in strict accordance with the opinion of the court, in which judgment was given for plaintiff. It is explicitly set forth that Hayward, Hobart and H. M. Levy conspired to defraud the stockholders of the corporation, and that they did defraud the stockholders to such an extent that the bullion yield of ores crushed at the Nevada mill amounted to only \$1,826,873, although it should have been \$2,616,491. All the circumstances of the conspiracy, as testified to on the trial, are stated in the findings. Each successive Board of directors of the Hale & Norcross Company, during the years that the conspiracy continued, are found to have been in collusion with Hayward, Hobart and Levy. The conclusions of law are to the effect that Fox is entitled to judgment for \$1,011,835. The decree contains the following: "The receiver shall have no power or authority to compromise any of the judgments or any part of any of the judgments herein given and made, nor to release any of the judgment debtors herein, except upon the order of this court to that end made. And it is further ordered, adjudged and decreed that W. T. Baggett and L. D. McKisick, attorneys for the plaintiff, are entitled to have and receive 25 per cent of all sums of money collected on the judgment or decree herein for their services, and that the receiver pay said sum to said W. T. Baggett and L. D. McKisick, whenever he shall collect the same."

The court fixed the bond of Receiver J. J. Groom at \$50,000.

PROF. S. W. BURNHAM, the senior astronomer at the Lick Observatory, has resigned his position and will return to Court work in Chicago, giving up astronomy altogether. He has especially distinguished himself as an observer of double stars, and his friends are surprised that he should retire from the field of science.

THE Gunright mine, near Phoenix, Arizona, will soon be opened again, this time by Denver and St. Louis capitalists. A 20-stamp mill is to be erected.

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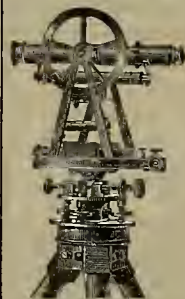
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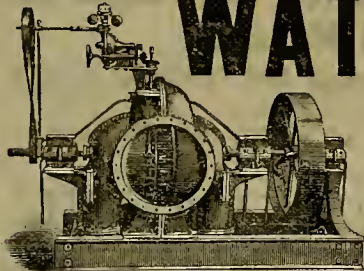
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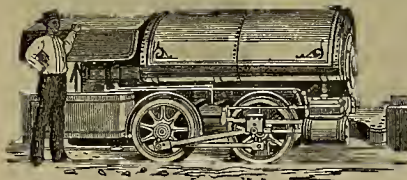
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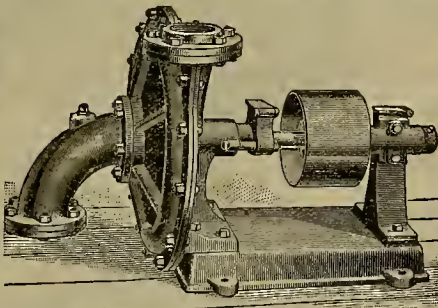
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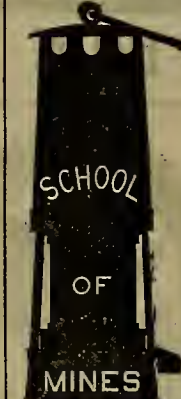
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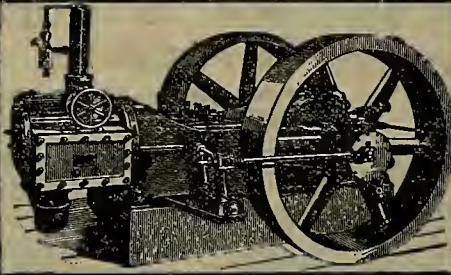
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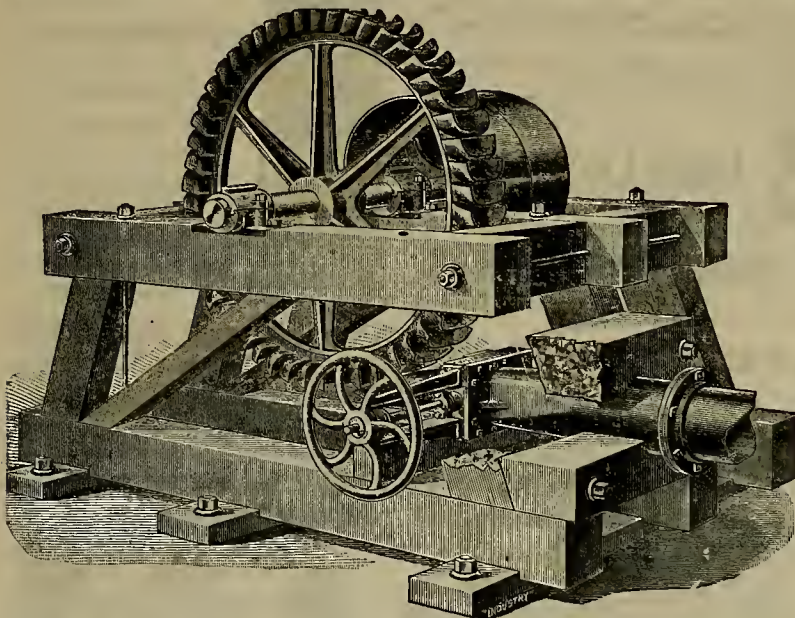
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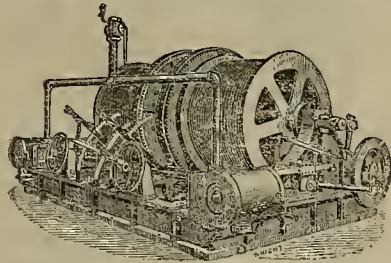
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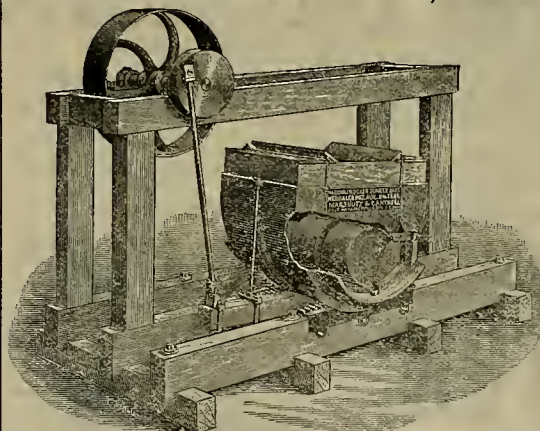
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Improvement in the Tulloch Concentrator.

James Tulloch of Angels, Calaveras Co., inventor of the Tulloch concentrator, which is manufactured by the Risdon Iron Works of this city, has just patented an improvement on the machine. In former patents issued to Mr. Tulloch, a traveling belt concentrator is shown with a mechanism by which the belt is advanced, and by which the table upon which it is carried is caused to rock from side to side. In these inventions the base of the belt-carrying frame or table is supported upon curved rockers, the effect of which is to carry the table from one side to the other in its oscillations. Under the present patent the frame is oscillated about a single supporting point, and consequently the belt dips downward alternately upon each side as it oscillates with a comparatively sharp movement, the arc of the circle upon which it moves depending upon the distance between the hinge or socket piece and the level of the belt. When supported upon rockers, as in the former patent, the belt is thrown from side to side, but without this sharp vertical motion, and the advantage in the present case is the more complete separation of the lighter from the heavier particles as they flow over the belt and the settling of the latter to the bottom. In order to prevent the material from flowing over the sides of the belt, it is passed over rollers, the central portions of which are cylindrical and the ends conical, the bases of the cones being outwardly and of larger diameter than the cylindrical portion. By these means the edges of the belt are always turned upwardly, thus forming a trough in which the material is caused to travel and prevented from passing off to either side of the belt. A thin and flexible belt may thus be used which, under ordinary conditions, would lie flat; but it is sufficiently upturned at the edges by the action of the rollers to give it the necessary trough shape and holding capacity. This belt will run very easily over the rollers without danger of breaking the edges.

The Mining Congress at Helena.

The Helena session of the National Mining Congress opens on July 12th. The Southern Pacific, in connection with other Western lines, has agreed to make a rate of one fare for the round trip to the mining congress, which is to meet at Helena, Mont., on July 12th. The tickets will be good for thirty days, and will be honored on the return trip over either the Ogden or Shasta route.

The Mayor of this city has appointed 21 delegates from San Francisco, and others will be appointed at large by the Governor. A number of the gentlemen selected have signified their intention of going, so that California will be more fully represented than at Denver last year.

Naturally the subject of silver will take up a large part of the time of the convention. Still, the matter of mineral lands on railroad grants will receive attention. The question of the illegal alienation of the mineral domain is important to the whole country, and each State and Territory has trouble on that score. The rights of agricultural claimants in some way seem to have become superior to those of the mineral claimant of late years. At any rate it is much easier to take up and patent agricultural than mineral land. All these matters will be acted on at the coming convention, at which all the mining States and Territories will be represented.

A MOVEMENT is on foot to hold a miners' convention some time in June in Grant's Pass, for the purpose of forming a local organization and cooperating as far as possible with the miners' association of California. J. T. Flynn is now in communication with officers of the last-named organization in San Francisco.—*Jacksonville (O.) Times*.

A New Camp in Arizona.

The oft repeated statement of the *Miner* that this county has never been fully prospected has again been verified by the discovery of the richest ledges of silver ore ever found in Arizona territory, or in fact on the Pacific coast.

The discoverers of this rich camp, says the *Mohave Miner*, are Judge Henry Schaefer, John Bennett and John L. Sullivan, of Gold Basin. The attention of these gentlemen was attracted to that place by an Indian, who exhibited some remarkably rich surface rock, and who for a consideration led the way to the mines. The new camp is fifty miles due north from Kingman, on the east side of the Sacramento valley, in the Cerbat range of mountains. The high range is mallapai or lava, while below in the low foothills the outcrop is micaceous granite; where the mines are found lava from the higher range covers the country for miles in the form of float and lava ash far into the valley. The camp is in a canyon facing the west, the ledges running directly east and west, following the general run of the canyon.

The original discoverers have located many of the best mines upon which considerable work is being done. The Schaefer Treasury, Grand Anny, Emma, Horn Silver, Occident and others belong to the discoverers. The three first named claims are on one vein and with a location made by W. B. Ridenour gives over a mile of locations on the one ledge, and traceable the entire distance on the surface until it reaches the valley on the west, where it is covered up by debris. On the east the ledge runs in under the lava mountain. Scattered over the surface of these claims is float rock broken from the ledges that will run thousands of dollars in silver. Tons of this rock can be shoveled up and shipped to the sampler. In the ledges streaks of solid yellow chloride and horn silver crops far above the surface. The Grand Anny shows a four-foot vein of ore, two feet of which will run fully \$1000 per ton, while the balance will mill over one hundred ounces per ton silver. The other ledges on this vein are fully as rich as the Grand Anny.

The Emma is situated on a knoll in the edge of the valley, and besides carrying hundreds of ounces of silver per ton runs over \$100 in gold.

Robert Patterson, Sol Rowe and Frank Robinson have a location named the Prince Albert, on the same hill on which is situated the Grand Anny, which shows up ore assaying \$3500. Chippings of a forty-five pound chunk of this ore runs fully \$6000 per ton. On the south side of the wash are the Horn Silver, Occident and other claims that show up wonderfully rich ore. The croppings of the ledges are black iron-cap, below which is the richest ore ever opened up in Arizona. Old-timers say the resemblance to the mines of Pioche, Nevada, is wonderful, although much richer.

There are at present thirty-five locations in the camp, but every day adds to the number, as people are flocking in by the hundreds and locating everything in sight. It is expected that in two months it will be one of the liveliest camps on the Pacific coast.

Water and wood are scarce, but steps are already being taken to pipe water in from springs six miles away, while in the valley cactus suitable for firewood grows in large quantities to a height of forty and fifty feet.

No mining strike in the past twenty years has caused such excitement in Mohave county as has this. Our miners were so used to hearing of rich strikes being made around them that they became indifferent and would not even go to see the claims although but a few miles away. But this last strike is not like the others. It has the bottom to it to make a camp greater than Leadville in its palmy days. On the surface of the ground is enough ore to make all the locators wealthy without putting a pick in the ground.

W. F. Grounds succeeded in getting a location on the principal ledge by a practical use of judgment. He found that two locations took in more surface ground than the customary limit of 1500 feet and by measuring off the claims secured nearly 300 feet of the best ground in the mine. He was immediately offered \$10,000 for the claim but refused the offer; as it is thought there is fully \$3000 worth of broken ore on the surface. Many shafts will be sunk in the valley in hopes of striking the large vein in a short time. The whole canyon is a net work of ledges and much litigation will result from location of cross ledges should the original locators not make locations of everything in sight.

The belt runs due west crossing the valley into the river range in Minnesota and

Weaver districts. A number of locations have been made in the same belt in the river range and rich ore taken from them. William Ridenour has a large chunk of ore at Hackberry from the new strike which is said to be the richest piece of ore ever seen in that town. Mr. Ridenour has been to nearly every new excitement on the Pacific Coast and is considered the best judge of a mine in the county, and his report on the new find is that nothing like it has been seen in years. John K. Mackenzie, L. J. Lassell, Judge Murphy and many other old miners say they have never seen so large a quantity of rich mineral on the surface before; that the surface indications of Pioche or Tombstone were as nothing compared with this great discovery. The new district runs east into Gold Basin, and covers four miles in width by a mile and a half in length. Inside this limit it is a perfect network of ledges.

The best way to get to the camp is from Kingman by way of Chloride, Quail Springs and Mountain Springs; a distance of fifty miles. From Hackberry over a good road to Gold Basin; thence to Cold Springs and over the mountain a distance of eight miles brings you to the mines—a total distance of sixty-five miles.

In Hackberry all is excitement and nearly the whole population has been out to the mines. Jas. Rosborough and Mrs. Davis and Mr. Philips have secured some good locations. People from the Park are appropriating every conveyance that can be used to carry them to the camp. Gold Basin is wholly deserted and other towns will be in the same fix as soon as the news reaches them.

The strike is not a fake as the mines are easily accessible. No snow to hide them away from sight, nor burning waste of sand to cross to reach them. A day's ride from Kingman or Hackberry will take you to the mines.

In thirty days water will be flowing into the camp from the surrounding springs and several thousand men will be working in the camp.

COMPRESSED AIR.—German engineers are of the opinion that quite a success has been achieved by the recent establishment at Offenbach of a system of pipes for the transmission of power by compressed air, the laying down of the pipes having been commenced about a year ago, and the work being consummated in the face of many difficulties. The total length of pipes thus laid amounted to 7760 yards, of which 1702 consisted of pipe one foot in diameter, 1710 yards of eight inches diameter, and 4347 yards of four inches diameter. The pipes were laid about one and one-half feet below the footpath, the connections of the pipes being made by means of India rubber, according to the method pursued for similar work in Paris, and valves are provided for shutting off the air from separate lengths of pipe. On the initial trial of the system, made by the engineering authorities of the town and by the Boiler Inspection Association, it appeared that there was a loss amounting to 0.11 of an atmosphere in seven and one-half hours, that is 0.39 of a cubic metre per hour kilometre, a loss equalling 13 per cent. on the daily output, the power transmitted being, on an average, 500 horsepower—a very favorable showing.—*Scientific Machinist*.

ELECTRICITY IN MINING.—The Leavenworth (Kansas) Coal Company is busy placing in its mine electric machinery, whereby the great labor and expense of coal mining will be simplified, and the price of coal will naturally be lowered. This device digs under and removes the earth from the vein of coal, and then tears the coal down, leaving for men only the work of placing the coal in the cars. The vein of coal in the Leavenworth mine is 22 inches in thickness, and all the coal mined in that vicinity has heretofore been done by the miners in a laying-down position, picking the coal from above. The machinery now being placed in position will do the work of 40 miners, while its cost will be practically insignificant.—*Iron Manufacturer*.

THE machinery of the new electrical ore reduction works at Albuquerque, N. M., has been ordered and the plant will be in operation this summer. It is claimed that refractory ores can be successfully treated by this process, and experiments have been made with ore from that county, which are said to have been highly satisfactory. Ex-Governor Stover, who is one of the members of the company which will erect the works, is very enthusiastic, and is certain that the venture will be a success. If it will do what is claimed for it, a large number of mines in this territory which produce low grade refractory ores can be worked profitably.

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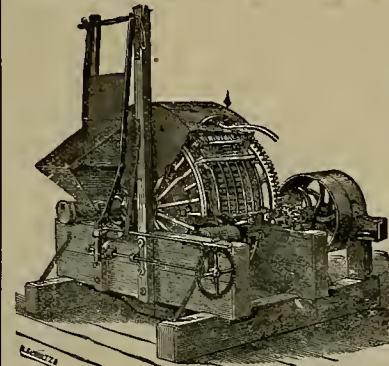
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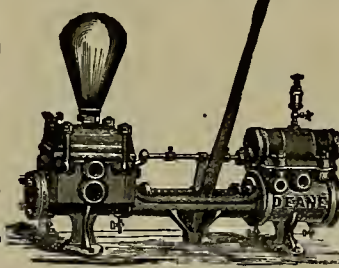
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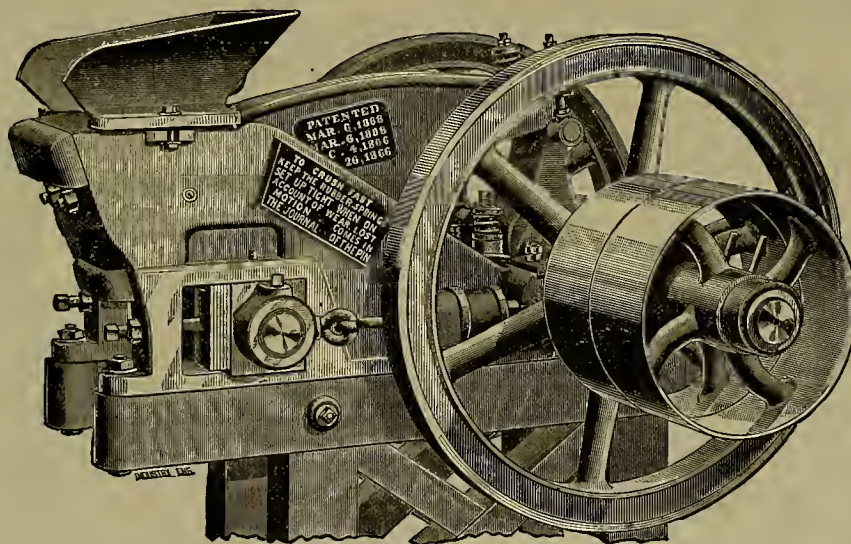
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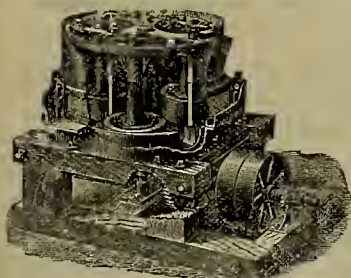
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(Continued from page 455.)

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The plans for the utilization of this water supply, for all purposes other than "power" purposes, will be carried into effect by the Sacramento County Water Co., a corporation which will be formed specifically for the purpose of receiving from the Folsom Water Power Co. its entire water supplies, franchises and privileges, after the "power" shall have been developed, and supplying with water, for both private and municipal uses, almost the entire area of Sacramento county. The map accompanying this shows the area which can be irrigated. Each square equals one township. On both systems of canals, reservoirs will be built to hold surplus water.

Similar "reservoir" facilities, and on even much greater scale, exist on the upper courses of the American river, above the dam of the Folsom Water Power Co., so that it is only a question of time, and the judicious expenditure of capital, to augment the supply of irrigation water just as fast as it may be called for. Undoubtedly, it would take many years to elaborate every detail of this vast system, and it will consequently be the policy of the company to first construct works which will supply the lands most in need of irrigation, and which will the most readily yield profits thereon. When the whole works are completed, some 400,000 acres of land may be brought under irrigation through the construction of the dams and canals.

INDISCREET MR. CROSSMAN.—The *Call* of Wednesday says: James H. Crossman, an aged mining man who recently arrived from Riverside, entered Hinckley alley Monday afternoon in search of N. Garcia, a restaurant-keeper whom he had known in Los Angeles. Garcia had moved, and while Crossman was wandering through the Latin quarter he fell in with two young men who agreed to show him Garcia's place of business. The three men drank considerably, and after Crossman came under "the influence" his companions took him to a room in a house on Broadway and took from his pockets \$220 in greenbacks and checks and a certificate of deposit representing \$8000 in a Riverside bank. The robbery was reported to the police yesterday, and Officers Anthony and Lindsay arrested Charles Flint, a petty thief, and William Watson, a Barbary Coast hoodlum. They were charged with grand larceny. About \$40 of the stolen money was found in their possession. The thieves had quarreled over a division of the spoils and separated. When arrested each attempted to shift the crime upon the other. Both were under the influence of liquor.

MR. JOHN BEST, of Lancaster, Pa., has just been appointed agent of the Lidgerwood Manufacturing Company, New York, manufacturers of hoisting engines. His territory will be Lancaster and vicinity. Mr. Best is well known as an engineer of prominence in his native city, and will doubtless meet with gratifying success in his efforts on behalf of the Lidgerwood "Standard" Hoisting Engines.

The soliciting committee has raised \$50,000 of the \$80,000 required for the location of an iron plant in San Diego. It is believed the entire amount required will be secured this week. English capital is backing the enterprise.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, June 23, 1892.

Business the past week was active, with a large increase in the output of goods sent out. There was a decided increase in the demand from agricultural districts and seacoast ports. The advance made in harvest work under favorable weather conditions, has inspired more confidence and San Francisco merchants do not hesitate in extending credit to merchants in the farming districts. Even at present low prices for ruling wheat and barley a fair profit is left farmers who employ the latest and best improved methods in farming. The expenses have been greatly reduced by using labor-saving machines so that prices now received for grain nets a profit, which, a few years ago, would have netted a loss. Miniog, deep gravel and river, is being vigorously pushed in all directions. With the rehabilitation of hydraulic mining and honest management of the Comstock mines, gigantic strides will be made by the industry. The local money market is easy, more so in this month than ever before in the month of June. Heretofore banks and corporations called in money in this month to disburse for interest and dividends in the month of July. This year there does not appear to be any necessity for such a course owing to a glut of money. The disbursements in next month will put several million dollars in circulation which will add still more to the depressed money market, unless it should be offset by a now unlooked for demand for money either for speculation or legitimate business purposes. At the East the same conditions obtain in the money markets which were noted last week. The foreign commerce of New York is steadily mounding in larger figures. The total imports for May were \$44,648,000, and excepting those for May last year are the largest since the settlement of the port. For 11 months the aggregate is \$490,643,000, as against \$492,380,000 for the corresponding months last year. The shipments from New York for May were \$36,267,335, showing a gain as compared with the same month of last year of \$4,418,265 in produce and merchandise, and a decrease of \$25,485,775 in specie, as the exports for May of last year included over \$30,000,000 in the precious metals. For 11 months the exports are \$433,076,899, against \$402,340,735 for the same time last year. The balance of trade to the end of April was upward of \$200,000,000 in our favor. The only dark cloud which looms up is the renewed fight between ironmasters and their employees in Pennsylvania and Ohio. In both localities the manufacturers propose a reduction of wages, and a prolonged contest is not improbable.

In referring to the present trouble, *Iron Age* says that "the all-absorbing topic is the prospect of a strike in the Western Rolling Mills on July 1st. The Amalgamated Association has practically adopted last year's scale, while the manufacturers demand a considerable reduction, the Pittsburgh makers being in conference to-day. In the steel trade interest centers on the action of the Carnegie Steel Co., which has formulated rates of wages designed to readjust matters on the basis of the great increase in tonnage brought about by improvements in machinery."

SILVER.—As was to have been expected, the market sagged off as soon as the mints had secured the required 4,500,000 ounces for June. These purchases, combined with the export movement, have made the market very sensitive and given to silver more speculative importance. Quite a number of speculators buy silver on the decline which invariably sets in each month after the mint has bought the required 4,500,000 ounces, and sell when the mint is in the market the succeeding month. Each month finds prices a shade higher. The two national parties have resolved on silver, and it now remains for Congress to decide which is more favorable to their pet views. It is claimed that the present Congress will not take any action on the silver question, but let it pass, to be taken up by the next Congress, when there is no election to be influenced by its action on the metal.

MEXICAN DOLLARS.—The market is dull and heavy at 70¢/71 cts.

QUICKSILVER.—Receipts the past week aggregate 431 flasks, and the exports by sea to Mexico 110 flasks. The market is steady, with a fair demand at current quotations.

BORAX.—There was received the past week 3100 sacks from Cheato, Oregon. Owing to the threatened labor strikes at the East, and also the usual dull midsummer trade, the market is slow and barely steady.

LIME.—Receipts the past week aggregate 3569 bbls. The shipments to Hawaii are quite free. The market is irregular at \$1.25 to \$1.50 per bbl.

PIG LEAD.—The market is reported weak at quotations. Eastern mail advices report more pressure to realize, and, as consumers were indifferent, concessions followed. At the decline, the market is barely steady.

PIG TIN.—The market does not appear quite so strong. The bull movement at the East appears to have seen its best, with the short July interests filling both at home and abroad. Unless the price of silver is advanced, it is not at all likely that tin will go as high as it did about ten days ago. Consumers at the East are holding off.

PIG IRON.—In our market there is absolutely nothing of interest to report. The stock is going into consumption. A continued dropping in the Eastern markets causes consumers to buy sparingly. New York mail advices report that market as follows: "Bessemer pig is weaker, and has sold at lower prices because the consumption during July will be heavily curtailed. Steel billets have advanced to \$22.75 to \$23 for June delivery, the advance being partly due to the purchasing of billets by concerns who expect a strike. By sympathy, the Eastern billet market has been strengthened. Consumers in the East are even now discriminating in favor of Eastern mills, which will not be affected by the struggle. In the Eastern pig iron market some Southern furnaces have made low prices, and the cutting in standard Northern brands threatens to lead to sharp retaliatory measures on the part of a leading producer. The charcoal pig iron market has been stirred up by the heavy buying of Eastern malleable iron manufacturers."

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	NO. AMT.	LEVIED.	DELINQ. AND SALE.	SECRETARY.
Alta S M Co, Nevada.....	42	150	June 18, July 28, Aug 18	L Oehorn, 349 Montgomery
Belcher S M Co, Nevada.....	44	250	May 17, June 21, July 12	C L Perkins, 331 Pine
Bodie S M Co, California.....	14	250	June 20, July 24, Aug 22	H D Walker, 39 Montgomery
Bullion M Co, Nevada.....	38	250	June 24, June 28, July 19	R R Grayson, 331 Pine
Butte S M Co, Nevada.....	56	500	June 4, July 11, Aug 4	W C Lewis, 723 Market
Challenge Con M Co, Nevada.....	11	250	May 16, June 20, July 12	O L McCoy, 331 Pine
Chollar S M Co, Nevada.....	33	500	May 28, June 7, July 27	O E Elliott, 309 Montgomery
Commonwealth Cons M Co, Nevada.....	8	100	June 15, July 21, Aug 18	R R Grayson, 331 Pine
St. Gothard S M Co, Nevada.....	5	50	June 3, July 14, Aug 4	T Wetzel, 320 Sansome
Diana M Co, Nevada.....	5	50	June 3, June 10, June 30	R R Grayson, 331 Pine
Evening Star M Co, California.....	4	210	May 7, July 12, July 29	J S Scoville, 320 Sansome
Fall River Con M Co, California.....	8	300	May 27, July 2, July 27	A Lorschach, 409 Olney
Golden Prize Con M Co, Nevada.....	8	250	Feb 23, June 22, July 13	O D Bennett, 327 Market
King of the Hill M Co, Nevada.....	69	500	June 7, July 12, Aug 4	A K Durbrow, 348 Montgomery
Justice M Co, Nevada.....	50	150	May 2, June 6, June 27	R E Kelly, 419 California
Mexican G & S M Co, Nevada.....	35	250	May 16, June 21, July 12	O E Elliott, 309 Montgomery
Mexican Phosphate and Sulphur Co.....	1	100	June 8, July 18, Aug 8	A Halsey, 328 Montgomery
Phil M Co, Nevada.....	18	500	June 3, July 7, July 27	E B Halsey, 39 Montgomery
Overman M Co, Nevada.....	1	500	May 19, June 22, July 11	G D Edwards, 414 California
Sierra Nevada M Co, Nevada.....	102	250	June 10, July 13, Aug 2	E L Parker, 309 Montgomery
Siskiyou Cons Quicksilver Co, California.....	4	100	May 14, June 17, July 8	E E Stone, 35 Pine
Summit M Co, California.....	12	50	June 27, July 11, July 29	M E Welles, 309 Montgomery
Turkey M Co, California.....	21	500	June 4, July 8, July 29	W J Garret, 303 Pine
Utah Con M Co, Nevada.....	15	250	June 7, July 11, July 29	A H Fish, 39 Montgomery
Yellow Jacket M Co, Nevada.....	51	250	June 9, June 14, July 18	W H Blauvelt, Gold Hill

COMPANY AND LOCATION.	MEETING.	SECRETARY AND OFFICE IN S. F.	DATE.
Silka M Co, Alaska.....	Annual.	E Charnock, 420 California	July 1
Union Cons M Co, Nevada.....	Annual.	A W Barrow, 303 California	July 18

COMPANY AND LOCATION.	AMOUNT.	SECRETARY AND OFFICE IN S. F.	PAYABLE.
Bulwer Cons M Co, Nevada.....	10	L O Oatman, 18	April 10
Quampan M Co, California.....	10	T Wetzel, 310 Pine	Aug 10
Oons Cal & Virginia M Co, Nevada.....	50	A W Halsey, 309 Montgomery	Aug 17
Eureka Con M Co, Nevada.....	25	H P Bush, 101 Sansome	Jan 8
Great Western Quicksilver M Co.....	25	A Halsey, 328 Montgomery	June 8
Pacific Cons M Co, California.....	1	L O Oatman, 18	July 1
Standard Cons M Co, California.....	10	J W Pew, 310 Pine	July 26

COPPER.—The markets at home and abroad are quiet. The looked-for improvement has not materialized, but it is still confidently looked for. At New York more Lake Ingot is offering, and to sell, it is doubtful if over \$11.70 per 100 lbs. could be secured. Castings brands are dull and heavy at the East.

COAL.—Imports the past week aggregate as follows: Tacoma, 4700 tons; Seattle, 3600; Coos Bay, 500; Departure Bay, 5647; Newcastle, N. S. W., 1100; total, 13,547 tons. The market appears to be shaping into a better position for sellers. Stocks have decreased, while the imports are light and the quantity on the way is not large. On the Atlantic seaboard the coal combine put up the price and contemplates another advance on July 1st. The consumption of steam in this State will soon begin to enlarge.

Eastern Metal Markets.

New York, June 23.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	89 1/2	11 7/8	4 1/2	2 1/2	26 1/2
Friday.....	89 1/2	11 7/8	4 1/2	2 1/2	21 1/2
Saturday.....	89 1/2	11 7/8	4 1/2	2 1/2	21 1/2
Sunday.....	89 1/2	11 7/8	4 1/2	2 1/2	21 1/2
Tuesday.....	89 1/2	11 7/8	4 1/2	2 1/2	21 1/2
Wednesday.....	89 1/2	11 7/8	4 1/2	2 1/2	21 1/2

Pig iron looks badly owing to July short sellers filling. Lead is steady at last week's decline. Copper has ruled dull and barely steady. Quicksilver is firm. Borax is dull but steady.

Mining Share Market.

SAN FRANCISCO, June 23, 1892.

Mining shares appeared to have taken on a new lease of life on last Monday, for they began to strengthen under the lead of Belcher. The shares of the Middle and Gold Hill group of mines advanced for two days, but the shares of the north end group were dull and heavy, with Ophir sold down by the bears. The short lived activity is referred to by the bear contingent "as a dying kick of the share market." The action of the share market justifies their belief that it is the throes of death, for never in the history of the Comstock mines was dealing in mining shares so light. Freeding the 1888 deal, and as for that of all deals, the shares sold at low prices but there was active trading and brokers counted their daily commissions by the dollars; but now while shares are low trading is very light, and brokers' daily commissions do not average enough to pay office expenses. It is all outgo and no income. Not only are they running behind in office expenses but such stock exchanges as to levy assessments to pay current expenses. This looks very much as if brokers are reaping their just reward. They planted and watered a tree from whose branch clubs have been taken to knock out the little financial hounds, they boast of being possessed of, or, in other words, they gave to the tools of the mill rings their proxies, and now they are to continue idle, looking at this. This course they were induced to by "tips," money paid, or other equally as disgraceful and dishonest methods.

The only way brokers can redeem the market, for many of them appear past redemption themselves, is to unite and demand of the rings that they turn over the mills to the miners. This is the only possible way by which the public can be induced to trade. It is dry rot now, and by proper fumigation and application of tonic, the business can be made healthy and brought up to a higher standard, where dealing in mining shares will partake more of the legitimate and not of gambling at a thieves' proposition. The cry should be, turn the mills over to the miners, and the rings will not do it, and their free will, they force them by law, through suits, both civil and criminal. It is openly asserted by well-informed mining men that nearly every mine on the lode can be made to pay dividends under honest management and the mines owning the mills.

The manager of owner of the cyanide process for Nevada announces that he can reduce Comstock ore and return 90 percent of its assay value. J. H. Kinkadee, a well-known Comstock mining man has invented a new process by which low grade Comstock ore can be worked at the small expense of two dollars a ton, against six dollars a ton, the average rate now charged. Mr. Kinkadee also claims that by his process a higher percentage of bullion can be returned than is now returned by the mills. Working tests have been made of the above two processes with very satisfactory results, fully substantiating what is claimed for them. In view of this it becomes more urgent that the mines own the mills so as to have introduced the latest and best improved methods for reducing Comstock ore. It is now claimed that the California Pan Mill was razed because the percentage of bullion returned was so high that very little was left for the "little joker" to keep for the private benefit of mill owners. If this is true, and persons considered thoroughly reliable, say it is, then it is only reasonable to conclude that as long as the mills

are not owned by the mines, so long will no improved methods be introduced for the benefit of mine shareholders.

Shares in the Gold Hill group were slightly higher. The rings are sedulously having reported an improvement in one or two of the mines in that group, but under the present system of mining and milling on the Comstock, it would take ore bearing veins nearly pure gold to get the managers to have shareholders receive the smallest fraction of the bullion that is not confiscated for private purposes. It is claimed that next month the inside will start in on a contest for the control of Savage, but whether they will succeed in getting outsiders to buy remains to be seen. While Comstock mines are all right, it is said in the way in which bullion disappears and assessments loom up, that is all wrong to every person except members of the rings. Under these circumstances it is the height of nonsense to give favorable news from the mines.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING June 1.	WEEK ENDING June 8.	WEEK ENDING June 15.	WEEK ENDING June 22.
Alpha.....	.20	.35	.20	.15
Alta.....	.35	.70	.25	.15
Alta.....	.50	.40	.50	.40
Belcher.....	.80	1.15	.75	.90
Bodie.....	.20	.10	.10	.10
Bodie & Belcher.....	2.00	2.45	1.90	2.10
Bodie.....	.50	.50	.50	.50
Bodie.....	.30	.30	.30	.30
Bulwer.....	.40	.40	.40	.40
Commonwealth.....	.20	.20	.20	.20
Oons Va. & Cal.....	3.85	4.55	3.87	4.40
Challenger.....	.35	.45	.35	.40
Ophir.....	.50	.85	.40	.55
Confidence.....	2.00	1.50	1.60	1.25
Oons Imperial.....	.20	.50	.40	.45
Ophir.....	.20	.20	.20	.20
Grova.....	.95	1.20	.80	.95
Crocker.....	.10	.10	.10	.10
De Monte.....	.16	.16	.16	.16
Eureka.....	.15	.20	.15	.15
Excelsior.....	.15	.30	.15	.15
Grand Prize.....	.10	.10	.10	.10
Gault & Curry.....	1.05	1.35	.90	1.10
Hale & Norcross.....	1.35	1.65	1.25	1.55
Julia.....	.15	.15	.15	.15
Justice.....	.10	.10	.10	.10
Kentuck.....	.05	.10	.10	.10
Lady Wash.....	.10	.15	.10	.10
Monro.....	.10	.40	.40	.40
Nevada.....	1.70	2.10	1.40	1.75
North Belle Isle.....	.25	.15	.15	.15
Nov. Queen.....	1.00	1.30	.90	1.05
Occidental.....	.35	.45	.40	.40
Ophir.....	2.80	3.15	2.25	2.45
Overman.....	.40	.50	.35	.40
Potosi.....	.65	.95	.65	.65
Peerless.....	.10	.10	.10	.10
Peer.....	1.10	1.35	.95	1.10
Quicksilver.....	.25	.30	.25	.30
E. B. & M.....	.25	.30	.25	.30
Sierra Nevada.....	1.10	1.45	1.05	1.15
Silver Hill.....	.10	.10	.10	.10
Siskiyou.....	1.00	1.40	1.00	1.10
Union Con.....	.10	1.40	1.00	1.10
Utah.....	.20	.30	.15	.20
Yellow Jacket.....	.55	.80	.45	.60

*Assessment added.

San Francisco Metal and Coal Market.

THURSDAY, June 23, 1892.	
ANTIMONY.	STEEL.
Per lb.....	@ 15
BORAX.....	@ 18
Refined, in car lots.....	@ 75
Pick & Hammer.....	@ 85
Concentrated.....	@ 40
All grades jobbing at advance.	@ 42
COPPER.	
Sol.....	@ 22
Sheet.....	@ 22
Ingot, jobbing.....	@ 14
Do, wholesale.....	@ 12
Fire Box Sheets.....	@ 24
IRON.	
Bar, base.....	@ 3
Norway, base.....	@ 4
PIG IRON.	
Eglington.....	@ 20
Glenbrook.....	@ 20
Am. Soft, No. 1.....	@ 20
Oregon Pig.....	@ 20
Quincy Sound.....	@ 20
Clay Lane White.....	@ 20
Langdon.....	@ 20
Thornlife.....	@ 20
Gatsherr.....	@ 20
Walden.....	@ 20
Gargano.....	@ 20
OHOREME IRON ORE.	
Per ton.....	@ 10
LEAD.	
Pig.....	@ 4
Bar.....	@ 4
Sheet.....	@ 4
Pipe.....	@ 4
COAL.	
Spot Lead.....	@ 8
Wellington.....	@ 8
Greta.....	@ 8
Nainaimo.....	@ 8
Am. Soft, No. 1.....	@ 8
Oons Bay.....	@ 8
Canal.....	@ 8
Egg hard.....	@ 10
Umberland, in sacks.....	@ 10
Do, bulk.....	@ 10
Walden.....	@ 10
Scott's Spinal.....	@ 10
Brymbo.....	@ 10
West Hartley.....	@ 10
TO LOAD—PER TON.	
Am. Soft, No. 1.....	@ 8
Liverpool Steam.....	@ 8
Scott's Spinal.....	@ 8
Canal.....	@ 8
Quicksilver.....	@ 8
Umberland.....	@ 8
Egg hard.....	@ 10
West Hartley.....	@ 10
COKE.	
English, to load.....	@ 8
Do, in bulk.....	@ 8
Do, in sacks.....	@ 8
For export.....	@ 8

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JUNE 14, 1892.

- 476,778.—SACK-FILLING AND SEWING MACHINE—Bibb & Timewell, Spokane, Wash.
 477,107.—TICKET PUNCH—W. C. Downing, S. F.
 477,172.—CAR BRAKE—J. W. Fisher, Palouse, Wash.
 477,110.—PAINT—W. B. Frederick, S. F.
 477,111.—CONCENTRATOR—Geo. Gates, Jackson, Cal.
 477,114.—BUMPER FOR VEHICLE SPRINGS—Milton Hall, S. F.
 477,013.—WASHING MACHINE—C. F. Lane, Tolare, Cal.
 477,129.—DEBRICK—G. L. Langhton, Reno, Nev.
 477,136.—HEADER STEER WHEEL BRAKE—D. E. Mentzel, Spangle, Wash.
 476,807.—HOTEL DESK—J. D. D. Mortimer, Stockton, Cal.
 477,147.—FLOOR OR ROOF FOR BUILDINGS—G. W. Parker, S. F.
 477,148.—LIGHT TRANSMITTING FLOOR—G. W. Parker, S. F.
 477,075.—SAFETY CAR—Wm. Skyrme, S. F.
 476,935.—ELECTRIC RAILWAY—C. P. Tatrow, Spokane, Wash.
 476,907.—BASE BAR FOR VIOLINS, ETC.—J. H. Tibbitts, San Diego, Cal.

The following brief list by telegraph, for June 22, will appear more complete on receipt of mail advices:

California—Milton A. Wheaton, S. F., can-heading machine; George H. Tietur, S. F., sign-etching machine; George H. Mareh, S. F., feed rolls; Armand R. Kluizer, S. F., table; Levi M. Kellogg, S. F., safety attachment for elevators; George F. and H. N. Gray, S. F., concrete mixer; George Grisel and F. Severio, S. F., machine for wrapping block matches; David Gutermaite, Petaluma, wash rest; Ivanpah, Petaluma, design; Julius A. Bidwell, Petaluma, pin; John A. Barker, Pasadena, head rest; John McCoy, Pasadena, pocket perfume case; Hector McKinnon, Eureka, bag lock; Thomas T. Scott and J. J. Shealer, Eureka, sawdust burning and air blast apparatus; Charles T. Tarpenning, Fresno, and L. B. Sherwood, Turlock, means for transmitting power; Washburn—John McKinnon, Colfax, clothes drier; George Biehn, Tacoma, window shade fixtures; A. Hughes, Spokane, rein holder; Oregon—Joseph Beel, Troutdale, feedwater heater; Rob Roy Parrish, Portland, furniture cast; Nevada—James McFarland, Virginia City, faucet.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible by mail for telegraphic order. American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CONCENTRATOR.—George Gates, Jackson, Amador Co. No. 477,111. Dated June 14, 1892. This is an improvement on the former invention patented by the same inventor Sept. 2, 1890. Its object is to provide a better distribution of the pulp between the supply sluices and the separating tables.

BUMPER FOR VEHICLE SPRINGS.—Milton Hall, S. F. No. 477,114. Date June 14, 1892. This consists of a semicircular and hollow elastic pad or block having extensions formed at each end and in combination therewith of a case adapted to inclose the lower portion and the extensions and means for securing the same.

DERICK.—Geo. L. Langhton, Reno, Nev. No. 477,129. Dated June 14, 1892. This derick is one of the class used for stacking hay. It consists in certain novel construction of the mast, arms and operating ropes so as to make a simple and effective portable derick.

TICKET PUNCH.—Wm. C. Downing, S. F. No. 477,075. Dated June 14, 1892. The object of this invention is to provide a punch with convenient mechanical operating mechanism and a means for providing a check and register of the fares taken by the preservation of marked clippings from the tickets which are punched.

SAFETY CAR.—Wm. Skyrme, S. F. Dated June 14, 1892. The inventor calls this "an accident-escape attachment for railway cars." It consists of a series of door openings formed in the floors or roofs of the cars—doors which said openings are normally closed and means by which the doors are automatically opened whenever an accident occurs by which the car is upset so as to leave free egress to the passengers. This provides an easy means of escape where the ordinary doors or windows of the coach are not available.

PAINT COMPOUND.—Wm. B. Frederick, S. F., assignor to the Atmospheric Paint Compound Co. This is a preparation which is especially valuable for the purpose of mixing with ordinary paints. The effect of the use of the compound is to cause the paint to spread more easily and cover a broader surface. It also causes the paint to last longer.

DIVIDEND NOTICE.

The German Savings and Loan Society, 526 California Street.

FOR THE HALF YEAR ENDING JUNE 30, 1892, A dividend has been declared at the rate of five and one-tenth (5 1/10) per cent. per annum on Term Deposits, and four and one-quarter (4 1/4) per cent. per annum on Ordinary Deposits, payable on and after FRIDAY, July 1, 1892. GEO. TOURNEY, Secretary.

RISDON IRON WORKS PAYS THE FREIGHT.



Common Sense New Steel Whim

All Complete for \$125, Freight Prepaid to any Railroad Station in California.

No cog wheels or clutches to break. Ninety per cent of this whim is wrought iron and steel, and will spring or bend instead of breaking, and besides, can be repaired at any blacksmith shop should breakage occur, thus obviating the necessity of sending away hundreds of miles sometimes and waiting a week for repairs. It can be packed anywhere a jack can go, the heaviest piece weighing 800 pounds. Total weight, 800 pounds.

It is just the whim to open up mines in isolated camps where steam power and experienced men are hard to get. With one horse 25 tons can be hoisted 300 feet on each shift. It is just as safe and reliable as an engine. Over 1800 in use, some running eight years without one dollar's expense. We make two, four and eight-horse power whims for heavy mining, also derrick whims, and ever thing pertaining to horse power hoisting.

Buy a good whim and put more money into underground work is the way to open up a mine and make it pay.

For circulars and cuts giving full information, write to

RISDON IRON WORKS,
BEALE AND HOWARD STS., SAN FRANCISCO.

Assessment Notices.

GOULD & CURRY SILVER MINING COMPANY.
Location of principal place of business, San Francisco, California; location of works, Virginia Storey County, Nevada.

Notice is hereby given that at a meeting of the Board of Trustees, held on the seventh (7th) day of June, 1892, an assessment (No. 69) of Twenty-five (25) Cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, Room 69 Nevada Block, No. 309 Montgomery Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the twelfth (12th) day of July, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 4th day of August, 1892, to pay the delinquent assessment together with costs of advertising and expenses of sale.

By order of the Board of Trustees,
ALFRED K. DURBROW, Secretary.

Office—Room No. 69 Nevada Block, No. 309 Montgomery Street, San Francisco, California.

THE BUTTE KING MINING COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Butte County, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of June, 1892, an assessment (No. 4) of five cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, 723 Market St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 11th day of July, 1892, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 2d day of August, 1892, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
W. C. LEWIS, Secretary.

Office, 723 Market St., San Francisco, Cal.

TERKOFF G. M. AND M. COMPANY. LOCATION of principal place of business, San Francisco, Cal. Location of works, Butte County, Cal.

Notice is hereby given that at a meeting of the Board of Directors, held on the 31st day of May, 1892, an assessment (No. 8) of one cent per share was levied upon the Capital Stock of the Corporation, payable immediately in U. S. Gold Coin, to the Secretary, at the office of the Company, 808 Pine St., San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 6th day of July, 1892, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the 29th day of July, 1892, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

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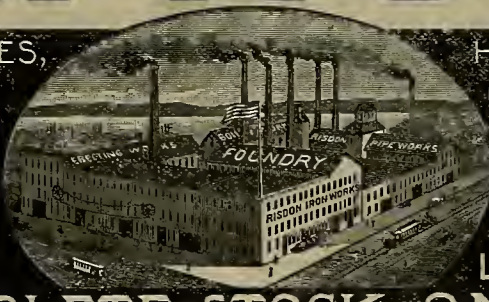
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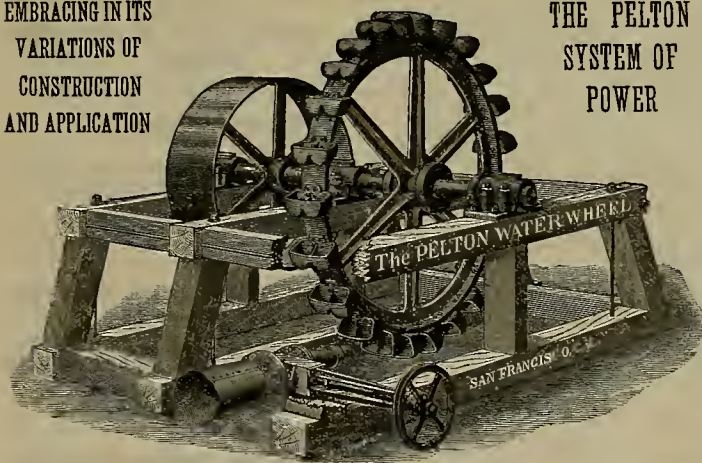


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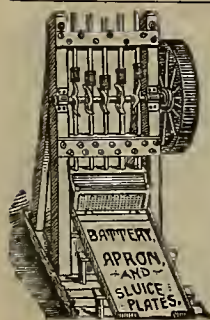
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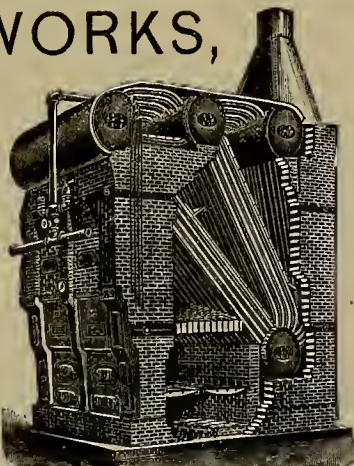
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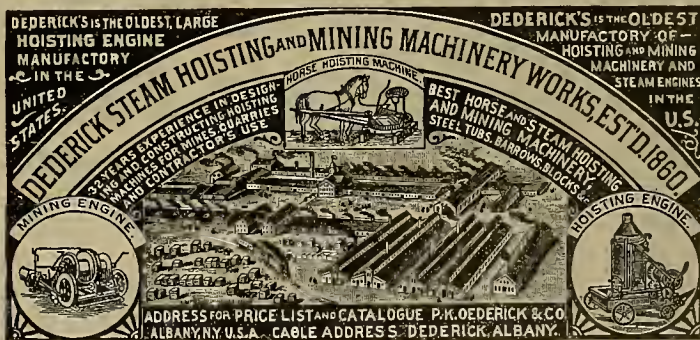
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